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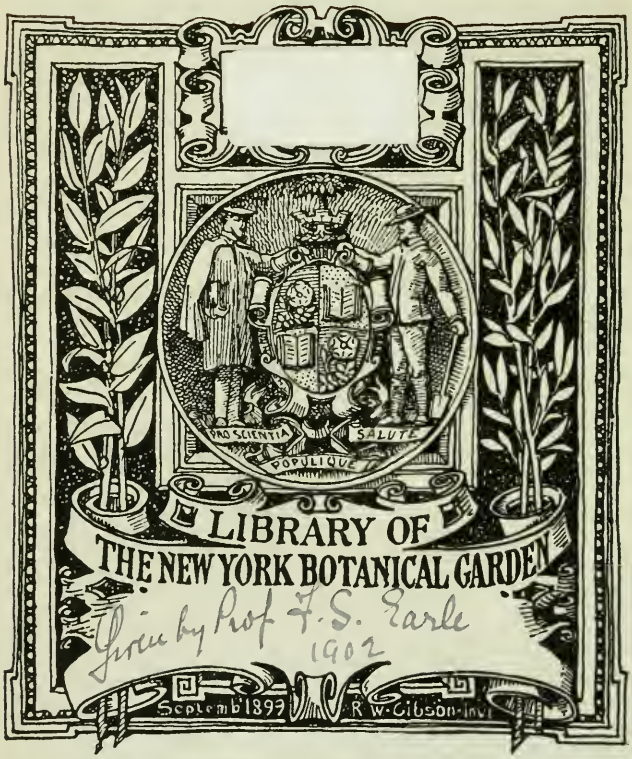

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Robt F Brewer

TRANSACTIONS

OF THE

ILLINOIS STATE

HORTICULTURAL SOCIETY,

FOR 1870.

BEING THE

PROCEEDINGS OF THE FIFTEENTH ANNUAL MEETING,

HELD AT

GALESBURG, DECEMBER 13, 14, 15, AND 16,

WITH OTHER

Reports and Papers upon Horticultural Topics, Proceedings of Local Societies, etc.

NEW SERIES—VOLUME IV.

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FRUIT, OR HORTICULTURAL DISTRICTS.

I. NORTHERN ILLINOIS.

1. *Fox River District*—Boone, Cook, DeKalb, DuPage, Grundy, Kane, Kankakee, Kendall, Lake, La Salle, McHenry, and Will. 12.

2. *Rock River District*—Bureau, Carroll, Henry, Jo Daviess, Lee, Ogle, Putnam, Rock Island, Stephenson, Whiteside, Winnebago.—11. Total, 23.

II. CENTRAL ILLINOIS.

3. *Illinois River District*—Adams, Brown, Cass, Fulton, Hancock, Henderson, Knox, McDonough, Marshall, Mason, Mercer, Menard, Morgan, Peoria, Pike, Schuyler, Scott, Stark, Tazewell, Warren, Woodford.—21.

4. *Grand Prairie District*—Champaign, Christian, Coles, De Witt, Douglas, Edgar, Ford, Iroquois, Livingston, Logan, McLean, Macon, Moultrie, Piatt, Sangamon, Shelby, Vermillion.—17. Total, 38.

III. SOUTHERN ILLINOIS.

5. *Centralia, or Wabash District*—Clark, Clay, Crawford, Cumberland, Edwards, Effingham, Fayette, Franklin, Hamilton, Jasper, Jefferson, Lawrence, Marion, Richland, Wabash, Wayne, White.—17.

6. *Alton, or Kaskaskia District*—Bond, Calhoun, Clinton, Greene, Jersey, Macoupin, Madison, Monroe, Montgomery, Perry, Randolph, St. Clair, Washington.—Total, 13.

7. *Grand Chain District*—Alexander, Gallatin, Hardin, Jackson, Johnson, Massac, Pope, Pulaski, Saline, Union, Williamson.—11. Total, 41. Grand Total, 102.

INTRODUCTORY.

To the Members of the Society:

It is but just to the editor of this volume, to say that the preparation for it was conducted under circumstances very unfavorable to success. The delay in the publication of the volume for 1869, and the continued hope that it would soon appear, caused delay in commencing the correspondence, preliminary to collecting material for the work.

It was found quite embarrassing to even commence the preparation of the *fourth* volume of the series with but very little knowledge of the contents of the *third* volume. His remembrance of what transpired at the previous annual meeting was all the knowledge he had prior to the receipt of the book itself, on November 26th, 1870. He trusts, therefore, that the omission of any subject that should have a place in this volume, or the repetition of matter, if any, contained in the last will be excused.

It has been deemed best to postpone any revisions of the Society's List of Trees, Plants and Fruits, and devote much of the time of the meeting, and space in the book to the consideration of subjects involving principles that are fundamental to an intelligent prosecution of the art of Horticulture; also to the best modes of cultivation.

The publication, in this volume, of lists of fruits and trees, carefully prepared by reliable and experienced horticulturists in different parts of the State, will prove of great value to persons in the respective localities, who design to plant orchards, vineyards, or fruit gardens; even more valuable than the "voted lists" of the whole Society.

The more scientific portions of the book, it is hoped will be read with interest by all who have a just appreciation of the vast scope of the causes which combine to produce the growth of a tree, or develop the rich juices of a fruit or the beauties of a flower.

To all those who have so cordially responded to solicitations for articles, both for the Annual Meeting and for insertion in this volume, the thanks of the editor are gratefully tendered.

That whatever good the book may contain, may reach the readers in time to be appropriated by them before all desire or relish for its contents shall have been destroyed by disappointed hopes, is the sincere wish and determination of their humble servant,

THE SECRETARY.

MORRIS, Grundy Co., Ill., January, 1871.

OFFICERS FOR 1871.

PRESIDENT:

ARTHUR BRYANT, Princeton, Bureau Co.

VICE PRESIDENTS:

1st District—ROBERT DOUGLASS.....Waukegan, Lake County.
2d " SAMUEL EDWARDS.....La Moille, Bureau County.
3d " DR. A. G. HUMPHREY.....Galesburg, Knox County.
4th " M. L. DUNLAP.....Champaign, Champaign County.
5th " J. W. FLETCHER.....Centralia, Marion County.
6th " H. J. HYDE.....Godfrey, Madison County.
7th " P. R. WRIGHT.....South Pass, Union County.

SECRETARY:

O. B. GALUSHA.....Morris, Grundy County.

ASSISTANT SECRETARY:

H. J. DUNLAP.....Champaign, Champaign County.

TREASURER:

JONATHAN HUGGINS.....Woodburn, Macoupin County.

EXECUTIVE BOARD:

ARTHUR BRYANT, W. C. FLAGG, TYLER MCWHORTER, A. M. BROWN, and O. B. GALUSHA.

STANDING COMMITTEES FOR 1871.

Gentlemen on these Committees are expected to act independently, and each is requested to report upon his topic with reference to his particular district—Northern, Southern, or Central, as the case may be. It is believed that important facts and principles may be discovered, relating to the *conditions* to which fruit culture in Illinois must conform, by a careful study of atmospheric phenomena, our soils, insects, and birds, in connection with vegetable physiology and the hygiene of plants.

METEOROLOGY:

NORTHERN.	CENTRAL.	SOUTHERN.
James W. Tollman, Winnebago.	Wm. M. Baker, Champaign.	John H. Tice, St. Louis, Mo.

GEOLOGY AND SOILS:

J. Shaw, Mt. Carroll.	W. F. Bliss, Nokomis.	H. C. Freeman, La Salle.

BOTANY AND VEGETABLE PHYSIOLOGY:

H. H. McAffee, Freeport.	T. J. Burrrill, Champaign.	George Vasey, Richview.

ENTOMOLOGY:

Wm. Le Baron, Geneva.	C. V. Riley, St. Louis, Mo.	T. A. E. Holcomb, South Pass.

ORNITHOLOGY:

Jona. Periam, Chatsworth.	G. W. Minier, Minier.	Jas. E. Starr, Alton.

ORNAMENTAL AND TIMBER TREES:

Samuel Edwards, La Moille.	J. W. Fell, Normal.	George Vasey, Richview.

FRUIT PACKAGES:

H. D. Emery, Chicago.	E. A. Riehl, Alton.	P. R. Wright, South Pass.

TESTING NEW VARIETIES:

1. J. W. Cochran, Blue Island.
2. Samuel Edwards, Mendota.
3. D. B. Wier, Lacon.
4. M. L. Dunlap, Champaign.
5. B. Pullen, Centralia.
6. H. J. Hyde, Godfrey.
7. P. R. Wright, South Pass.

AD INTERIM:

A. M. Brown, Villa Ridge, Pulaski County.
E. Daggy, Tuscola, Douglass County.
A. R. Whitney, Franklin Grove, Lee County.

COMMITTEE OF CORRESPONDENCE.

The following named persons are respectfully requested to co-operate in furnishing information to the SECRETARY, STANDING COMMITTEES, and the VICE-PRESIDENTS, in their several Districts, on all points bearing upon the theory and practice of Horticulture, in their respective counties.

FIRST DISTRICT—ROBERT DOUGLASS, Waukegan, *Vice-President.*

Names.	P. O.	County.	Names.	P. O.	County.
Hon. L. W. Lawrence,	Belvidere,	Boone.	B. N. McKinstry,	Summer,	Kankakee.
H. D. Emery,	Chicago,	Cook.	S. G. Minkler,	Oswego,	Kendall.
H. C. Graves,	Sandwich,	DeKalb.	Dudley G. Smith,	Waukegan,	Lake.
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SECOND DISTRICT—SAMUEL EDWARDS, LaMoille, *Vice-President.*

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C. H. Keim,	Mt. Carroll,	Carroll.	W. A. Nourse,	Moline,	Rock Island.
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J. T. Little,	Dixon,	Lee.	Alex. Strachan,	Rockford,	Winnebago.
C. C. Wamsley,	Polo,	Ogle.			

THIRD DISTRICT—Dr. A. G. HUMPHREY, Galesburg, *Vice-President.*

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J. Q. Merriam,	Beardstown,	Cass.	E. C. Harkness,	Elmwood,	Peoria.
N. Overman,	Canton,	Fulton.	E. V. Rice,	Pittsfield,	Pike.
A. C. Hammond,	Warsaw,	Hancock.	D. C. Johnson,	Rushville,	Schuyler.
David M. Finley,	Oquawka,	Henderson.	J. R. Woods,	Winchester,	Scott.
Prof. J. V. N. Standish,	Galesburg,	Knox.	Wm. H. Butler,	Toulon,	Stark.
A. Hagerman,	Bushnell,	McDonough	Geo. W. Minier,	Minier,	Tazewell.
D. B. Wier,	Lacon,	Marshall.	J. E. Barnes,	Y'g America	Warren.
J. Cochrane,	Havana,	Mason.	J. G. Zeller,	Spring Bay,	Woodford.
T. McWhorter,	Aledo,	Mercer.			

FOURTH DISTRICT—HON. M. L. DUNLAP, Champaign, *Vice-President.*

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T. Montgomery,	Mattoon,	Coles.	John Davis,	Decatur,	Macon.
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E. Daggy,	Tuscola,	Douglass.	J. C. Johnson,	Monticello,	Piatt.
E. S. Curtis,	Paris,	Edgar.	L. C. Francis,	Springfield,	Sangamon.
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J. W. Clark,	Onarga,	Iroquois.	Hon. J. L. Tincher,	Danville,	Vermillion.
J. Periam,	Chatsworth,	Livingston.			

FIFTH DISTRICT—J. W. FLETCHER, Centralia, *Vice-President.*

Stephen Dolls,	Marshall,	Clark.	D. B. Brown,	Milton,	Jasper.
T. B. Clarke.	Xenia,	Clay.	J. S. Boggin,	Mt. Vernon,	Jefferson.
R. B. Huggings,	Hutsonville,	Crawford.	Peter Smith,	Sumner,	Lawrence.
Henry Griffing,	Hazle Dell,	Cumberl'd.	G. L. Brunton,	Centralia,	Marion.
Judge Mayo,	Albion,	Edwards.	Geo. Mason,	Parkersb'g,	Richland.
Benson Wood,	Effingham,	Effingham.	J. P. Grisler,	Meier,	Wabash.
E. W. Irish,	Farina,	Fayette.	W. W. George,	Fairfield,	Wayne.
Carroll Moore,	Benton,	Franklin.	R. S. Graham,	Carimi,	White.
Wm. Rickcords,	McL'nsboro,	Hamilton.			

SIXTH DISTRICT—H. J. HYDE, Godfrey, *Vice-President.*

J. G. Sprague,	Greenville,	Bond.	J. Huggins,	Woodburn,	Macoupin.
B. F. Childs,	Hardin,	Calhoun.	Hon. W. C. Flagg,	Moro,	Madison.
Sidney Breese,	Carlyle,	Clinton.	Wm. M. Jeffrey,	Rookwood,	Randolph.
B. S. Culver,	Whitehall,	Greene.	H. Engleman,	Bellville,	St. Clair.
J. E. Starr,	Elsah,	Jersey.	G. Wilgus,	Richview,	Washingt'n.

SEVENTH DISTRICT—P. R. WRIGHT, South Pass, *Vice-President.*

E. J. Ayers.	Cairo,	Alexander. Galatin.	L. L. Koch,	Golconda,	Pope.
J. M. Warren,	Elizabeth,	Hardin.	J. H. Crain,	Undulation,	Pulaski.
Samuel T. Brush,	Carbondale,	Jackson.	Charles Burnett,	Raleigh,	Saline.
Dr. Looney,	Vienna,	Johnson.	Parker Earle,	South Pass,	Union.
George Brown,	Metropolis,	Massac.	Wm. P. White,	Marion,	Williamson.

LIST OF MEMBERS FOR 1871.

Names.	P. O.	County.
Butterworth, T.	Quincy,	Adams.
Chatten, Clark	do.	do.
Hargis, J. H.	do.	do.
Kelly, A. B.	Camp Point,	do.
Mitchell, W. A.	Payson,	do.
Scarborough, A.	Quincy,	do.
Sennock, Thomas	do.	do.
Shepherd, Augustus	do.	do.
Turner, Samuel B.	do.	do.
Werner, J. B.	Lima,	do.
Bliss, H. N.	Providence,	Bureau.
Booth, Wm. A.	Tiskilwa,	do.
Bryant, Arthur Jr.,	Princeton,	do.
Edwards, Samuel	La Moille,	do.
Starr, F. L.	do.	do.
Stetson, Ezra	Neponset,	do.
Vandervoort, J. M.	Tiskilwa,	no·
Hallett, James	Mt. Carroll,	Carroll.
Burrill, T. J.	Champaign,	Champaign.
Dunlap, Albert	do.	do.
Dunlap, H. J.	do.	do.
Dunlap, M. L.	do.	do.
Phinney, J. B.	do.	do.
Vickroy, H. R.	do.	do.
Breese, Sidney	Carlyle,	Clinton,
Hooper, John H.	Pana,	Christian.
McLain, M. C.	Charleston,	Coles.
Montgomery, Tyra	Mattoon,	do.
Griffing, Henry	Hazel Dell,	Cumberland.
Emory, H. D.	Chicago,	Cook.
Peterson, P. S.	do.	do.
Sanders, Edgar	do.	do.
Graves, H. C.	Sandwich,	De Kalb.
Ely, W. W.	Farmer City,	DeWitt.
Miller, H. P.	do.	do.
Daggy, E.	Tuscola,	Douglass.
Ellsworth, Lewis	Naperville,	DuPage.
Ellsworth, M. S.	do.	do.
Thatcher, N. R.	do.	do.
Curtis, B. O.	Paris,	Edgar.
Irish, E. W.	Farina,	Fayette.
Jerold, Marvin	Vandalia,	do
Smith, James	do.	do.
Babcock, H. S.	Bush Creek,	do.
Baughman, J. H.	Canton,	Fulton.
Egerly, Samuel	do.	do.
Overman, N.	do.	do.
Snyder, T. W.	do.	do.
Young, A. P.	do.	do.
Clover, Amos	Gardner,	Grundy.
Clapp, Henry	Morris,	do.
Galusha, O. B.	do.	do.
Grist, George O.	do.	do.
Ray, L. B.	do.	do.
Sanford, E.	do.	do.
Stine, James	do.	do.
Thayer, C. H.	Minooka,	do.
Whitney, Lucius	Morris,	do.
Winsor, Thomas	do.	do.
Baxter, Emil E.	Nauvoo,	Hancock.
Grover, Wm. N.	Warsaw,	do.
Hammond, A. C.	do.	do.
McAffee, S.	Augusta,	do.
Patch, J. P.	do.	do.
Worthen, G. B.	Warsaw,	do.
Finley, David M.	Oquawka,	Henderson.
Watson, James	Olena,	do.
Calkins Anson	Woodhull,	Henry.
Chapin, J. R.	Kewanee,	do.
Mann, W. H.	Gilman,	Iroquois.
Pierson, W. P.	Onarga,	do.
Little, D. L.	Makanda,	Jackson.
Fulkerson, Wm. H.	Jerseyville,	Jersey.
Snedecker, Isaac	do.	do.
Starr, J. E.	Elsah,	do.
Le Baron, Dr. W. L.	Geneva,	Kane.
Todd, Hugh	Dundee,	do.
Cobb, Emory.	Kankakee,	Kankakee.
McKinstry, B. N.	Judson,	do.
Richards, W. C.	Momence,	do.
Hutchinson, Seym'r.	Lisbon,	Kendall.
Minkler, S. G.	Oswego,	do.
Seeley, J. S.	do.	do.
Wright, C. F.	Lisbon,	do.
Bidwell, G. E.	Altona,	Knox.
Carpenter, A. N.	Galesburg,	do.
Childs, Erastus	Oneida,	do.
Clay, A. C.	Galesburg,	do.
Colwell, Wm.	Sparta,	do.
Comstock, Prof. M. L.	Galesburg,	do.
Farnham, Eli	do.	do.

LIST OF MEMBERS FOR 1871—(CONTINUED.)

Names.	P. O.	County.
Fuller, Francis	Galesburg,	Knox.
Gale, W. S.	do.	do.
Hale, T. J.	do.	do.
Hester, H. D.	do.	do.
Hinckley, C. A.	do.	do.
Hoff, E. W.	Wataga,	do.
Humphrey, Dr. A. G.	Galesburg,	do.
Hunt, R. W.	do.	do.
Kitchell, A.	do.	do.
Mason, D.	do.	do.
McClelland, J. S.	do.	do.
Robbins, E. S.	do.	do.
Robbins, Levi	Wataga,	do.
Sisson, H. M.	Galesburg,	do.
Standish, Prof. J. V. N.	do.	do.
Weston, J. P.	do.	do.
Douglass, R. J.	Waukegan,	Lake.
Douglass, Robert	do.	do.
Baldwin, E.	Farm Ridge,	La Salle.
Brush, H. L.	Ottawa,	do.
Cook, Hon. B. C.	do.	do.
Cotta, J. O.	Mendota,	do.
Forbes, C. K.	Seneca,	do.
Freeman, H. C.	La Salle,	do.
Hathaway, E. C.	Ottawa,	do.
Paul, John	do.	do.
Porter, J. E.	do.	do.
Rugg, G. H.	do.	do.
Wiley, James	Troy Grove,	do.
Stafford, M. B.	Dixon,	Lee.
Whitney, A. R.	Franklin G.,	do.
Bancroft, L.	Pontiac,	Livingston.
Bennett, C. N.	do.	do.
Bingham, J. R.	Chatsworth,	do.
Hayes, Byron	Pontiac,	do.
Nims, E. H.	Forrest,	do.
Periam, Jonathan	Chatsworth,	do.
Beach, J. A.	Woodburn,	Macoupin.
Blodget, Daniel	Brighton,	do.
Chaffe, Dr. W. H.	Carlinville,	do.
Cummings, J. F.	Bunker Hill,	do.
Dubois, A. McKim	Carlinville,	do.
Eldred, E. B.	do.	do.
Eldred, Moses	do.	do.
Flanagan, John	Bunker Hill,	do.
Gore, D.	Carlinville,	do.
Hilliard, A. A.	Brighton,	do.
Hollister, E.	Woodburn,	do.
Howell, J. C.	Carlinville,	do.
Huggins, Jona.	Woodburn,	do.
Huggins, P. C.	Bunker Hill,	do.
Hunter, Capt. Geo.	Carlinville,	do.
James, Nutter	Bunker Hill,	do.
Loomis, T. L.	Carlinville,	do.
McComb, G. H.	Woodburn,	do.
McConnell, J. T.	Carlinville,	do.
Muhlemann, J. R.	Woodburn,	do.
Olmstead, Martin	Shipman,	do.
Pettengill, J. A.	Bunker Hill,	do.
Randolph, Abel	Virden,	do.
Scamen, W. S.	Shipman,	do.
Summerville, Thos.	Bunker Hill,	do.
Tunnell, John	Plainview,	do.
Williams, E. S.	Bunker Hill,	do.
Balsiger, John	Highland,	Madison.
Flagg, W. C.	Moro,	Madison.
Hollister, E. Jr.	Alton,	do.
Hull, E.	do.	do.
Hull, E. S.	do.	do.
Hyde, H. J.	Godfrey,	do.
Long, Dr. B. F.	Alton,	do.
Nichols, F. K.	do.	do.
Pearson, J. M.	Godfrey,	do.
Anderson, A.	Centralia,	Marion.
Brunton, G. L.	do.	do.
Fletcher, Frank	do.	do.
Fletcher, J. Warren	do.	do.
Hooton, M. M.	do.	do.
Mosser, Rev. Joseph	Salem,	do.
Reeder, D. O.	Centralia,	do.
Webster, Jabez	do.	do.
Wier, D. B.	Lacon,	Marshall.
Wier, Thomas	Henry,	do.
Hagerman, A.	Bushnell,	McDonough.
Rodgers, J. S.	Marengo,	McHenry.
Woodard, L.	do.	do.
Burroughs, Elisha	Bloomington	McLain.
Wilson, George M.	Heyworth,	do.
Bassett, J. R.	Aledo,	Mercer.
Boyd, R. H.	do.	do.
Hayes, D. H.	do.	do.
Lee, Graham	Hamlet,	do.
McWhorter, T.	Aledo,	do.
Sheroph, A. B.	Keithsburg,	do.
Baldwin, Isaac	Jacksonville,	Morgan.
Chapman, B. H.	do.	do.
Graff, Mrs. Geo.	do.	do.
Hay, A. S.	do.	do.
Lambert, E.	do.	do.
Milburn, N. N. Jr.	do.	do.
Morrison, Mrs. A. R.	do.	do.
Morse, C. M.	do.	do.
Pitner, Thos. J.	do.	do.
Taylor, J. N.	do.	do.
Tucker, Mrs. W. B.	do.	do.
Turner, J. B.	do.	do.
Williams, A. C.	do.	do.
Harkness, E. C.	Elmwood,	Peoria.
Perkins, Calvin D.	Princeville,	do.
Ross, L. F.	Avon,	do.
Tracy, A. L.	Elmwood,	do.
Roots, B. G.	Tamaroa,	Perry.
Brown, A. M.	Villa Ridge,	Pulaski.
Durley, W.	Hennepin,	Putnam.
Shepherd, Smiley	do.	do.
Stewart, J. W.	Florid,	do.
Crampton, A. A.	Coal Valley,	Rock Island.
Jennings, D. B.	Port Byron,	do.
Kinney, D. F.	Rock Island,	do.
Nourse, William A.	Moline,	do.
Pearsol, W. C.	Port Byron,	do.
Starkey, J.	Camden Mills,	do.

LIST OF MEMBERS FOR 1871—(CONTINUED.)

Names.	P. O.	County.
Francis, L. C.	Springfield,	Sangamon.
Post, H.	do.	do.
Springer, Phil. M.	do.	do.
Ward, J. M.	Naples,	Scott.
Scofield, F. K.	Freeport,	Stephenson.
Minier, G. W.	Minier,	Tazewell.
Robinson, J. W.	Tremont,	do.
Shaw, Henry	do.	do.
Earle, Parker	South Pass,	Union.
Essex, Isaac B.	Dongola,	do.
Lawver, A. M.	South Pass,	do.
Wright, P. R.	do.	do.
Barnes, J. E.	Young Am.,	Warren.
Crocky, William	Spring Grove,	do.
Finley, James	Monmouth,	do.
Rice, Thomas	do.	do.
Williams, James	Spring Grove,	do.
Pennington, L. S.	Sterling,	Whiteside.
Clark, L. G.	Channahon,	Will.
Nelson, W. T.	Wilmington,	Will.
Hopkins, T. F.	Rockford,	Winnebago.
Lee, C. F.	Minonk,	Woodford.

Names.	P. O.	State.
Bird, W.	Mt. Pleasant,	Iowa.
Bower, R. F.	Keokuk,	Iowa.
Brackett, G. B.	Denmark,	Iowa.
Murrell, J. A.	Green Castle,	Iowa.
Gray, J. B.	Mt. Pleasant,	Iowa.
McGrew, D.	Legrand,	Iowa.
Strohm, H.	Iowa City,	Iowa.
Rogers, W. H.	Indianapolis,	Indiana.
Carpenter, L.	St. Joseph,	Michigan.
Jackson, Samuel	Benton Harb.	do.
Nowlan, A. R.	do.	do.
Elliott, F. R.	Cleveland,	Ohio.
Warder, J. A.	do.	Ohio., Hon.
Well, H.	Trotwood,	Ohio.
Elliott, R. S.	Kirkwood,	Missouri.
Hanan, B. P.	Clark City,	do.
Murtfeldt, C. W.	St. Louis,	do.
Riley, C. V.	do.	do.
Manning, Robert	Salem,	Mass., Hon.
DeWitt, C. S.	Geneva,	New York.
Edwards, Samuel Jr.	Green Bay,	Wisconsin.
Ensign, Wm. C.	Beloit,	do.
Sutherland, S. B.	Waukan,	do.

The number of members is 258; representing 55 Counties in Illinois, and 8 other States. This exceeds the membership of any other year, by 97—that of 1870 being 133; representing 38 Counties and 3 other States—that of 1869 being 161; representing 42 Counties and 6 other States.

DELEGATES PRESENT.

CENTRAL ILLINOIS HORTICULTURAL SOCIETY—E. DAGGY, *Pres.*, Tuscola; H. J. DUNLAP, *Sec'y.*, Champaign.

NORTHERN ILLINOIS HORTICULTURAL SOCIETY—SAMUEL EDWARDS, *Pres.*, LaMoille; D. W. SCOTT, *Sec'y.*, Galena.

ADAMS COUNTY HORTICULTURAL SOCIETY—A. SCARBOROUGH, J. H. HARGIS, THOS. SINNOCK, S. B. TURNER, CLARK CHATTEN.

ALTON HORTICULTURAL SOCIETY—JONA. HUGGINS, W. C. FLAGG, E. S. HULL, J. E. STARR, I. SNEDECKER, H. J. HYDE.

ONEIDA HORTICULTURAL SOCIETY—W. B. LE BARON, *Pres.*, ERASTUS CHILD.

OTTAWA HORTICULTURAL SOCIETY—DR. JOHN PAUL.

MACOUPIN HORTICULTURAL SOCIETY—JONATHAN HUGGINS.

WARSAW HORTICULTURAL SOCIETY—A. C. HAMMOND, *Pres.*, GEO. B. WORTHEN.

EASTERN IOWA HORTICULTURAL SOCIETY—H. STROHM, Iowa City.

IOWA STATE HORTICULTURAL SOCIETY—J. F. TALLANT, Burlington; G. B. BRACKETT, Denmark, *Sec'y.*

WESTERN MICHIGAN HORTICULTURAL SOCIETY—SAMUEL JACKSON, Benton Harbor; A. R. NOWLAN, Benton Harbor.

INDIANA STATE HORTICULTURAL SOCIETY—W. H. RAGAN, *Sec'y.*, Indianapolis.

POMOLOGICAL RULES,

As adopted, with additions from American Pomological Society.

1. No new seedling fruit shall be entitled to the recommendation of this Society until its qualities shall be ascertained by at least five years' experience in more than one locality, and which is not at least equal to any similar variety of the first rank already known; or which, if only of second rate flavor, is superior in vigor, hardiness, productiveness, or other important quality or characteristics.

2. No new fruit shall be considered, as named, until it has been accurately described by some person or committee known to be conversant with existing varieties; and such description shall have been published in at least one horticultural or agricultural journal, or some pomological work of acknowledged standard character.

3. The originator, or he who first makes known a new variety, shall be entitled to name it, and such name, if suitable, shall be adopted by the writer describing the fruit for the first time.

But if the name proposed is inappropriate, or does not come within the rules of nomenclature, the describer shall be at liberty to give a name.

When two persons have named or described a fruit, the name and description first published, if according to the rules, shall have the priority.

4. In giving names to new varieties, all harsh, vulgar, or inelegant names, such as "Sheepnose," "Hogpen," etc., should be avoided, and no name should consist of more than two words, excepting only when the originator's name is added. Characteristic names, or those in some way descriptive of the qualities, origin, or habit of fruit or tree, shall be preferred. They may either be of intrinsic properties, as Golden Sweeting, Downer's Late, etc., or of local origin, as Newtown Pippin, Hudson Gage; or the season of ripening, as Early Scarlet, First Gage; or the form and color, as Golden Drop, Blue Pearmain; or which commemorates a particular place or person, as Tippecanoe, La Grange, Baldwin, or any other titles which may be significantly applied.

5. The description of new varieties of fruits shall embrace the following particulars:

First. An account of their origin.

Second. The fruit—its size, form and exterior color, texture and color of the flesh, flavor, and time of ripening, with the addition on stone fruits of the size of the stone, adherence or non-adherence of the flesh, form of the suture, and the hollow at the stem, and in kernel fruits, of the size of the core and seeds, the length, position and insertion of the stalk, and form of the eye.

Third. The tree—its marked characters of growth, young and bearing wood, foliage, and blossoms. In peaches, the form of leaf, glands, and size of blossoms. In strawberries, the character of the blossoms, whether staminate or pistillate. In grapes, the form of the bunch or berry.

6. No variety of fruit, vegetable, tree, flower, or other horticultural product, shall be placed upon, or taken from the lists of the Society, unless it receive a majority of six votes, of persons residing in the district for which it is recommended; and it is recommended that no person vote upon the question unless he have personal experience or observation of the qaalities of the variety in question.

CONSTITUTION AND BY-LAWS,

AS AMENDED AT THE ANNUAL MEETING, 1870.

CONSTITUTION.

I. This Association shall be known as the ILLINOIS STATE HORTICULTURAL SOCIETY.

II. Its object shall be the advancement of the science of Pomology and of the art of Horticulture.

III. Its members shall consist of *Annual* members, paying an annual fee of one dollar; of *Life* members, paying a fee of twenty dollars at one time; and of *Honorary* members, who shall only be persons of distinguished merit in Horticulture or kindred sciences, who may, by vote, be invited to participate in the privileges of the Society. The wives of members shall be members without fee.

IV. Its officers shall consist of a President, one Vice President from each Fruit District in the State, a Secretary, an Assistant Secretary, a Treasurer, and an Executive Board, which shall consist of the President, the last three Ex-Presidents, and the Secretary; all of whom shall be elected at the annual meeting, and serve from the first of January until the thirty-first of December, and until their successors are elected.

V. It shall hold an annual meeting and other meetings, and an annual fair, as the Society or the Executive Board may direct.

VI. This Constitution may be amended at any regular meeting, by a two-thirds vote of the members present.

BY-LAWS.

I. The President shall preside at all meetings of the Society; call meetings of the Executive Board, and, under its direction, have a general superintendence of the affairs of the Society, and direction of the expenditure of money; he shall deliver an annual address upon some subject connected with Horticulture, and shall appoint all committees, unless otherwise ordered.

II. The Vice Presidents, in the order of their Districts, shall act in case of absence or disability of the President; and shall, by correspondence and personal intercourse with the horticulturists of the various counties of their respective districts, endeavor to organize local societies, obtain accurate information of the condition and progress of Horticulture therein, and report annually, in writing, to the Society.

III. The Secretary shall conduct the correspondence of the Society; have charge of its papers, books and reports, and prepare its reports for publication: and shall receive, for so doing, his necessary expenses for postage, stationery, printing, expressage, and office rent, and the sum of three hundred dollars per annum; he shall render an annual account in detail of such necessary expenses, which shall be referred, with the Treasurer's report, to a special auditing committee.

IV. The Assistant Secretary, in the case of the absence or disability of the Secretary, shall perform his duties; and shall aid him, at the annual meeting in making his report.

V. The Treasurer shall receive, and keep an accurate account of, all moneys belonging to the Society, and disburse the same upon the written orders of the President, which he shall retain and file as vouchers; he shall make an annual report to the Society of the receipts and disbursements, which, with the vouchers, shall be referred to a special auditing committee appointed at the annual meeting. Before entering upon his duties, he shall give bond to the Society in the sum of five thousand dollars, for the faithful performance of his duties; such bond to be approved by the Executive Board.

VI. The Executive Board shall, subject to the direction of the Society, manage all its affairs.

VII. There shall be chosen annually, by the Executive Board, a Standing Committee, to consist of one or more members from each of the three divisions—Northern, Central, and Southern—of the State, on the following subjects:

1. Meteorology in its relation to Horticulture.
2. Geology and Soils.
3. Botany and Vegetable Physiology.
4. Entomology.
5. Ornithology.
6. Ornamental and Useful Trees.
7. Fruit Packages.
8. Testing New Varieties.
9. Ad Interim.

VIII. These By-Laws may be altered at any meeting by a majority vote.

LAWS AFFECTING HORTICULTURE.

An Act to Incorporate the Illinois State Horticultural Society.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That Smiley Shepherd, O. B. Galusha, S. G. Minkler, W. C. Flagg, J. T. Little, W. H. Van Epps, Lewis Ellsworth, Jason C. Ayres, W. A. Pennell, J. W. Fell, W. Durley, Samuel Edwards, their associates and successors, members of the Illinois State Horticultural Society, be and are hereby declared to be a body politic and corporate, known by the name and style of "*The Illinois State Horticultural Society*."

SEC. 2. The object of the Society being to promote the science of Pomology and the art of Horticulture, they shall be allowed, for those purposes only, to take and hold real and personal estate to the amount of fifty thousand dollars.

SEC. 3. This Society shall have the right to contract and be contracted with, to sue and be sued, to plead and be impleaded, to answer and be answered unto, in all the courts of law and equity of this State, and shall further enjoy all the privileges incident to incorporations of said character, and not inconsistent with the laws of this State.

SEC. 4. It shall and may be lawful for said corporation to have and use a common seal, and the same at their pleasure to change, alter, and make anew, and in general have and exercise all such rights, privileges, and immunities as by law are incident to or necessary to the society herein constituted.

SEC. 5. The Society shall have power to alter or amend their present constitution, to make, alter, or repeal such by-laws as may be deemed necessary for carrying out the objects of the Society.

SEC. 6. This act shall be in force from and after its passage.

APPROVED FEBRUARY 16, 1865.

[NOTE—The Society was *first* incorporated Feb. 11th, 1857—two months after its organization. —ED].

An Act to Punish Fruit Thieves.

Be it enacted by the people of the State of Illinois, represented in the General Assembly, That if any person or persons shall hereafter enter the enclosure of any person without the leave or license of such owner, and pick, destroy, or carry away the fruit of any apple, plum, peach, pear, or other fruit tree or bush, such person or persons shall be guilty of a misdemeanor, and upon conviction thereof, may be fined any sum not less than ten dollars, nor more than fifty dollars, and may be imprisoned in the county jail, for any period not exceeding twenty days. The penalties incurred by violation of this act may be enforced by indictment in any court having jurisdiction of misdemeanors in the county where the offense is committed, or the fine may be recovered in an action for debt before any justice of the peace of such county.

APPROVED FEBRUARY 26, 1861.

An Act for the Protection of Fruit and Ornamental Trees, Shrubbery, and Vegetable Products.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That if any person or persons, in this State, shall willfully, maliciously, and without lawful authority, cut down, root up, sever, injure, peel, or destroy any fruit or ornamental tree, cultivated root or plant, fruit or other vegetable production, grape, strawberry, or cranberry vines, currants, gooseberry, raspberry or cultivated blackberry bushes, standing or growing on or being attached to the land of another, or shall willfully and without lawful authority, cut down, root up, destroy, or injure any fruit or ornamental tree or shrubbery, planted or growing on any street, lane or alley, or public grounds in any city, borough, or incorporated town in said State, every such person so offending, shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be punished by a fine of not more than five hundred dollars, or by imprisonment in the jail of the county not exceeding three months, or both, at the discretion of the court, and shall, moreover, be liable in double the amount of damages to the party injured.

This law to take effect from and after its passage.

APPROVED FEBRUARY 15, 1865.

An Act for the Protection of Growing Fruit.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That if any person or persons shall, hereafter, enter the enclosure of any person, without leave or license of such owner, and destroy or carry away any part or portion of the fruit of any apple, pear, peach, plum, or other fruit tree or bush, such person or persons shall be deemed guilty of a misdemeanor, and, upon conviction thereof, may be fined in any sum not less than ten nor more than fifty dollars, and may be imprisoned in the county jail for any period of time not exceeding twenty days. The penalties incurred by a violation of this act may be enforced by indictment in any court having jurisdiction of misdemeanors in the county where the offense is committed, or the fine may be recovered in an action of debt before any justice of the peace of such county.

APPROVED FEBRUARY 16, 1865.

An Act for the Protection of Orchards, and to Prevent the Destruction of Small Birds.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That it shall not be lawful, in this State, for any person to shoot, or in any other manner to kill or destroy, or to entrap, ensnare, or otherwise capture any of the following description of birds, to wit: The blue bird, swallow, martin, musquito hawk, whip-poor-will, cuckoo, woodpecker, cat bird, brown thrasher, red bird, hanging bird, rice bird, sparrow, wren, humming bird, dove, goldfinch, and mocking bird.

SEC. 2. Every person who willfully violates the provisions of the preceding section, or who shall willfully destroy the nest or eggs of any of the birds herein before designated, shall be punished by a fine of not more than five dollars for each offense.

This Act to take effect and be in force from and after its passage.

APPROVED FEBRUARY 24, 1859.

An Act making an appropriation in aid of the State Horticultural Society of Illinois.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That there be appropriated for the use of the State Horticultural Society, to be expended in the payment of premiums, in publishing the Transactions of said Society, procuring scientific investigations relating to Horticulture, and paying expenses of Ad Interim Committees, the sum of two thousand dollars per annum.

SEC. 2. The said sum of two thousand dollars shall be paid to the Treasurer of said State Horticultural Society, on the order of the President and Secretary of the same.

APPROVED FEBRUARY 28, 1867.

An Act for the Protection of Consignors of Fruit, Grain, Flour, etc., to be sold on Commission.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That if any warehouseman, storage, forwarding, or commission merchant, or his or their agents, clerks, or employes shall convert to their own use the proceeds or profits arising from the sale of any fruits, grain, flour, beef, pork, or any other goods, wares, or merchandise, otherwise than as instructed by the consignors of said goods, and shall on the demand of the consignor fail to deliver over the proceeds or profits of said goods, after deducting the usual per cent. on the sales as commission, shall be found guilty of a misdemeanor. And any person or persons who shall be found guilty of retaining or embezzling any money prohibited in this section, not exceeding one hundred dollars, shall be punished by a fine of not more than five hundred dollars, or imprisoned in the jail of the county not exceeding three months, or both, at the discretion of the court, and shall, moreover, be liable in double the amount of damages to the party injured; any person or persons who shall be found guilty of retaining or embezzling a greater sum than one hundred dollars, shall be punished by fine, not more than five hundred dollars, or imprisoned in the jail of the county not exceeding one year, or both, at the discretion of the court; and shall, moreover, be liable in double the amount of damages to the party injured.

SEC. 2. This act to take effect from and after its passage.

APPROVED MARCH 4, 1869.

An Act to permit the planting of Shade and Ornamental Trees along the Public Roads.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That it shall be lawful for owners or occupants of lands bordering upon any public road in this State, to plant shade and ornamental trees along and in such road, at a distance not exceeding one-tenth of the legal width of the road from its margin.

SEC. 2. This act shall be deemed a public act and be in force from and after its passage.

APPROVED MARCH 25, 1869.

LIBRARY,
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BOTANICAL
GARDEN.

PROCEEDINGS OF THE

Fifteenth Annual Meeting,

HELD AT GALESBURG,

DECEMBER 13-14-15-16, 1870.

The Illinois State Horticultural Society convened at "Caledonia Hall," December 14th, at 9.30 A. M., in response to the following call and programme:

ILLINOIS STATE HORTICULTURAL SOCIETY.

The Annual meeting of this Society for 1870 will be held in the City of Galesburg, commencing on Tuesday, the 13th of December, at 9.30 A. M., and close on the following Friday. The city is easily accessible by railroads from all directions.

A commodious Hall—with rooms adjoining convenient for the exhibition of Fruits and Vegetables—has been secured for the use of the meeting, by the local Horticultural Society. The citizens offer to all who will come, a cordial welcome and the hospitality of their homes. Lectures and papers upon varied and interesting topics connected with Horticulture are pledged by gentlemen of well known ability. (See programme). These lectures and papers will be followed by short discussions of the more important topics upon which they treat. All who desire are free to attend and participate in the benefit of these sessions.

The following Railroads will return members from the meeting at one-fifth fare, viz: Chicago, Burlington & Quincy with all its branches; Chicago, Alton & St. Louis and branches; Illinois Central and branches; Chicago, Rock Island & Pacific and branches; Chicago, Danville & Vincennes; Burlington, Cedar Rapids & Minn.; Indianapolis, Bloomington & Western; Chicago & Northwestern, from Chicago only.

It is confidently expected that other railroad companies will respond favorably to the requests which have been made for like reductions of fares; if so, the fact will be duly announced in the Prairie Farmer and Western Rural.

Specimens of choice fruit and vegetables are solicited for the exhibition tables—especially of new varieties or choice seedlings.

JAN 6 - 1902

Programme for Meeting.

TUESDAY 13th A. M.]

1.—President's Address.
2.—Reports of Secretary and Treasurer.
3.—Reports of Vice-Presidents.
1st District—L. WOODWARD, Marengo.
2d District—SAMUEL EDWARDS, Lamoile.
3d District—A. C. HAMMOND, Warsaw.
4th District—TYRA MONTGOMERY, Mattoon.

TUESDAY, P. M.

1—Report of State Horticulturist, - - - DR. E. S. HULL.
2—Report of ad interim Committee on Grapes, - D. B. WIER.
3—Paper on the Cultivation of Evergreens and their benefits, - - - - - ROBERT DOUGLASS.

TUESDAY EVENING.

1—Lecture on the Variations and Improvements in Fruit Trees and their propagation, DR. J. A. WARDER, Cincinnati.
2—Paper on Simple Flowers for summer display in the flower garden, - - - - - EDGAR SANDERS.

WEDNESDAY, A. M.

1—Reports of Vice-Presidents.
5th District—J. W. FLETCHER, Centralia.
6th District—H. J. HYDE, Godfrey.
7th District—A. M. BROWN, Villa Ridge.
2—Report of ad interim Committee on Apples, - O. B. GALUSHA.
3—Paper on the Propagation and Culture of the most desirable Deciduous Trees for artificial planting on the prairies, - - - ARTHUR BRYANT, Sen.

WEDNESDAY, P. M.

1—Paper on Snout Beetles injurious to Fruits and Vegetables, by - C. V. RILEY, State Entomologist of Missouri.
2—Paper on Moral Influence of Horticulture, - ALEX. STRACHAN.
3—Report of ad interim Committee on Pears, - PARKER EARLE.

WEDNESDAY EVENING.

1—Paper on Birds Beneficial and Injurious to Horticulture, J W. VELIE.
2—Lecture on Horticultural Education, - PROF. J. B. TURNER.

THURSDAY, A. M.

1—Election of Officers.
2—Fixing time and place of next Annual Meeting.
3—Examination of new varieties of Fruits and Vegetables, and distribution of Books and Cions.
4—Paper on Packing Fruits for market, - - A. M. BROWN.

THURSDAY, P. M.

1—Report of ad interim Committee on Peaches and Plums, E. S. HULL.
2—Paper on Economic Vegetable Gardening, - JONATHAN PERIAM.
3—Paper on the sudden appearance and disappearance of Noxious Insects, - DR. WM. LE BARON, State Entomologist.

THURSDAY EVENING.

1—Essay, "The effects of Settlement and Cultivation on Fruit Culture," - - by ROBERT MANNING of Boston.
2—Paper on the Influence of Wines upon the American People, , by DR. C. W. SPAULDING, of Kirkswood, Mo.

FRIDAY, A. M.

1—Paper—Landscape Gardening, - - - - - JOHN BLAIR.
2—Reports of Committees.
3—Unfinished business. Adjournment.

W. C. FLAGG, *President.*

O. B. GALUSHA, *Secretary.*

Judge A. Kitchell, of Galesburg, President of the Galesburg Horticultural Society, called the convention to order at 9.30 A. M., and, in behalf of said Society, delivered the following ADDRESS OF WELCOME:

Mr. President and Gentlemen of the State Horticultural Society:

In behalf of the citizens of Galesburg, and especially of the members of our City Horticultural Society, I offer you a hearty welcome. We are thankful to you and to our enterprising townsman, Dr. Humphrey, through whom you were invited hither, for giving us this visit. With cheerful hearts our citizens greet you as laborers and scholars in a noble science.

The Almighty in his goodness has vouchsafed to us an infinite variety of beautiful and useful trees, plants, and flowers, and of luscious and nourishing fruits. Horticulture has analyzed and classified them, and, by infinite pains and experiment, brought forth a catalogue of the choicest, but as the old adage required "a bitter with every sweet," so we find that in this the enemy "hath sought out many inventions." With blight and mildew, with bugs and borers, beetles and parasites everywhere, we find that in all tree, and plant, and fruit life, there are ravaging destroyers.

Your programme promises us a rich feast. The bill of fare has many things of special interest to us. Calling to mind the many blackened and dead pear, cherry, and other fruit trees of the past season, besides the withered and blighted evergreens, and looking back over our scanty harvest of fruits, of which we found scarce a peach or apple, pear, plum, or cherry, that was not inhabited by worms and curculios, or prematurely bitten by birds, we are greatly in hope that you have come to us with fresh stores of knowledge and inventions against these evils. I have no right to anticipate the feast, or to meddle in the enter

tainment you have prepared, but I may be allowed to indicate a few subjects of special interest.

We are pleased to see that you have the birds before you. Our own amateurs and orchardists are not entirely in accord upon this question. It is alleged by some that there are grape and cherry thieves among the feathered tribe, whose lives fruit growers are not bound to respect. While others more sentimental and poetical, if not equally practical, claim only innocence and beauty for the whole family. With these—

> "The jay, the pie, and e'en the boding owl,
> That hails the rising moon, have charms."

In their view—

> "'Tis love creates their melody; and all
> Their waste of music is the voice of love."

But with the former, guns and deadly arts are turned against all who—

> "Rifle the sweets and taste the choicest fruits,
> Yet scorn to ask the lowly owner's leave."

Another topic of surpassing interest is the wine question. How to drink wine and not make drunkards, is a problem of infinite concern. The grape is perhaps our choicest fruit, and it is rapidly twining itself around every home, and into the affections of every family. Wine making is steadily on the increase in this country. But we scarcely speak of wine, without calling up the horrible picture of our country's greatest curse. I will not anticipate, nor for an instant presume, that the moral power of a body like yours, will not be given to the cause of reform.

But when we contemplate this our most delicious fruit and its wine, we pause to enquire whether perchance we may "put a stumbling block in our brother's way."

> 'Tis pity wine, which nature meant
> To man in kindness to present,
> And give him kindly to caress—
> And cherish his frail happiness;
> Of equal virtue to renew
> His weary mind and body, too,
> Should (like the cider tree in Eden,
> Which only grew to be forbidden.)
> No sooner come to be enjoyed,
> But the owner's fatally destroyed.

In connection with this topic comes rightfully the one on "Moral Influence of Horticulture." Horticulture, of right, claims its place among the sciences.

The annual compilation of your own learning and experiments, as well as that exhibited throughout the country, attest that gradually the whole processes of nature and manual culture are more perfectly understood. Many old things wise in their day, are becoming foolishness

before your analyses. Our people as a nation, by freely crossing, hybridizing, and grafting from other nations have produced a race which we think there is no boast in claiming as superior in mental, moral, and physical endowment. So strikingly is this superiority already demonstrated, that we look forward to the rapid revolution of all nations toward us in language, in law, in liberty, and religion.

So in Horticulture, by grafting and crossing, by hybridizing and varied experiments, varieties of fruits and trees are multiplied, their qualities improved, the ignorance and errors of cultivators eradicated, and the laws of nature and economy of men reduced to simple rules and processes. Because Solomon in his day, after trying all things in horticulture, doubtless, as well as in other luxuries, pronounced them all vanity, it is scarce meet that we who are not Solomons should, in our day, look upon Horticulture as a vain thing. In this department science and knowledge is as profound and profitable to the race as in the others.

The problems of progress and civilization are often difficult to solve.

Remembering the simple habits and few wants of our pioneer life, and comparing them with the long array of craving desires and modern habits, we can scarce find any measure of our civilization, but in the enumeration of our wants. And in horticultural attainments we sometimes suspect the highest standard is found in him who has the most capacious stomach, at least in him who the keenest sense of taste and smell, of touch and sight.

These generalities are scarce a fitting prelude to the entertainment before us, and I will conclude this salutation of welcome with the hope that as "iron sharpeneth iron," and "a man sharpeneth the countenance of his friend," that your friendly faces will greatly sharpen the horticultural countenances of this community, for which they will always remember you with thanks.

The President, Hon. W. C. Flagg, then announced the State Horticultural Society to be in session.

The meeting was opened with prayer by Rev. Mr. Bartlett of Galesburg.

The Annual address of the President was listened to with interest by a larger number than have ever before been present at the opening of an Annual Meeting.

PRESIDENT'S ADDRESS.

Fellow Members of the Illinois State Horticultural Society:

We meet to-day, for the purpose of holding our *Fifteenth* Annual Meeting, in the City of Galesburg. Her citizens, foremost in other good works, have given us a hearty greeting, and secured for us these comfortable quarters during our stay with them. For their kind expressions of good will, on your behalf I tender them our sincere thanks, and express

the hope that in the feast of pomological reason and flow of entomological soul that await us, we may in some part repay their many acts of kindness.

We meet this year, I believe, with our ranks unbroken by death: and, although the common lot of all can not in the good providence of God be an evil thing, yet we shrink from the mysteries of the silent land and congratulate ourselves that we are still here, living and strong. "Like a timid child, I dread to go out alone into the darkness," wrote a brave man* near the end of a prematurely closed life; and perhaps for the same reason. We have heard old wives' stories of evil things lurking in that darkness. But

> "There is no death; what seems so is transition:
> This life of mortal breath
> Is but a suburb of the life elysian
> Whose portals we call death."

And whilst it is natural and therefore not wrong to dislike separation from relations and friends, and to desire that death shall not come in the midst of life and energy, but in the accepted time of old age and bodily decay; yet I would deprecate the idea which seems a relic of heathenism, that death is the dark conclusion of the day.

The experience of the year, its hopes, its disappointments, and its fulfillments, you will hear in detail from those who are to follow me. It will be as usual a diverse story of successes in one region and failures in another, as may be expected in the wide range of climate in the State; and I will not undertake to generalize upon topics concerning which there are are many present whose more thorough obervations during the present year enable them to speak with accuracy and confidence.

Turning to business matters, I have to report that an examination into our financial condition shows the necessity of a more economical expenditure of our funds. Since the first year after the law granting us an annual appropriation of $2,000 from the State Treasury was passed, our expenses have considerably exceeded that amount annually: but, hitherto, the deficiency has been made up by the large balance remaining the first year and the annual membership fees. We have now reached the point, however, where we must lessen our expenditures, or increase our income. We have further to consider the fact that under the new Constitution our appropriation must be bi-ennially renewed. I believe we are entitled to the appropriation for the coming year, but certainly after that period the appropriation must be looked after at each session of the legislature. In reply to a circular issued by the Governor to officers of State Institutions and other beneficiaries of the State, I have asked that the appropriation be increased to $3,000 per annum, so as to enable us to secure scientific investigation of the more occult points in horticultural science.

Chancellor Hoyt, of Washington University, St. Louis.

The warrants drawn since the beginning of our last annual meeting are the following:

During the Year 1869.

No. 51	W. C. Flagg, Postage, Expressage, and Stationery,	$ 50.00
52	Geo. Bulkley, on account of Reporting,	20.00
53	Sam'l Edwards, Expenses Ad-Interim Committee,	43.60
54	E. S. Hull, Traveling Expenses allowed,	107.00
55	Winter Bros., Photographing,	7.00
56	George Bulkley, Balance for Reporting,	30.00
57	Thomas Meehan, Lecture and Traveling Expenses,	120.00
	Total,	$377.60

During the Year 1870.

No. 58	D. B. Wier, Expenses on Ad-Interim Committee,	$ 9.00
59	O. B. Galusha, on account of Salary,	100.00
60	C. V. Riley, 1000 Engravings, B. D. Walsh,	65.00
61	E. S. Hull, Account of Salary,	350,00
62	O. B. Galusha, for Ad-Interim Committee,	100.00
63	E. S. Hull, Account of Salary,	200.00
64	O. B. Galusha, Office Expenses,	50.00
65	W. C. Flagg, Expressage and Postage Reports.	40.00
66	R. P. Studley & Co., Bill of Printing,	1,553.89
	Total,	$2,467.89

The items of the Bill of R. P. Studley & Co., are the following:

For	33 Reams Paper,	$ 297.00
"	1,551,175 Ems Composition at 70c.,	1,085.82
"	Paper and Printing 750 covers,	7.85
"	Press Work at 75 cts.,	97.50
"	Binding 1000 copies,	137.50
"	Packing Cases, Drayage, etc.,	10.00
	Total,	$1,635,67
	Less 5 per cent. as per agreement,	81.78
		$1,553.89

Of this amount, the Northern Illinois Horticultural Society pays $175 and the Central Illinois Horticultural Society pays $65, leaving $1,313.89, the amount the transactions of 1869 cost this Society, or some $50 less than those of 1868. Our Secretary has been receiving bids for the volume for this year at rates very much below this, and it is hoped that the expense of publication may be brought within $1,100.

The subjects of securing the collection of late State Entomologist, Mr. Walsh, to the State, and the appointment of a State Entomologist to succeed him, were referred to the Executive Committee for their action. In accordance with the instructions of the Society and the desire of the other members of the Committee, Mr. Baldwin and myself waited upon Governor Palmer soon after our last meeting adjourned and subsequently.

We found the Governor fully appreciated the value of the Walsh collection and the desirability of retaining it within the State, and, as you are aware, he has since purchased it, and it is temporarily deposited in the Academy of Sciences at Chicago. As regards the office of State Entomologist, we found several worthy candidates: but, after due inquiry, we agreed that Dr. Wm. Le Baron of Geneva, was the most desirable man for the place, and solicited, with others, that he might receive it. The Governor, after due deliberation, gave him the appointment.

Resolutions passed at the last meeting offering to co-operate with the State Agricultural Society in holding their Annual Fair, were submitted to the Board of that Society in January last, but they declined to do more than receive our advice in making up a premium list, and no further action was had in the premises. I submit their action on the subject herewith.

There are a few subjects to which I will venture to call your attention as of special, or at least immediate importance.

First of these is an act for the encouragement of timber planting. It is estimated by those who have the best means for judging, that we are near the end of the natural supply of pine lumber in the North and West. From 15 to 25 years is the estimated extent of its duration. Our own forests of less valuable trees are rapidly decreasing in the demand for newl fields, and more firewood Whilst it is true that the Osage orange wil give us the fences which we cannot longer afford to build of northern pine; and iron, stone, and brick will doubtless to a great extent replace wood in our buildings, bridges, furniture, and implements; and while I have less fears than many have of any change of climate resulting from the removal of our somewhat scanty wood-growth of Illinois, nevertheless I believe that sound public policy, forecasting statesmanship, demands that we shall do what we can to encourage the planting and growing of timber trees. I hope a committee will be appointed to draft a bill to be discussed, amended, if need be, and approved by this meeting, and then submitted to the General Assembly, for the encouragement of tree planting, and the preservation of woodlands.

The desirability of experiments in many points connected with Horticulture should give this Society an interest in an attempt to establish Agricultural Experiment Stations in various parts of the State, which shall do somewhat the same work for Illinois that Lawes and Gilbert have done for England, and the "Versuchs Stationen" for Germany. I suggest here and shall propose elsewhere, that wherever in a fit locality, citizens shall donate to the State desirable buildings and grounds for an Experiment Station, the State shall appropriate an annual amount of $2,000 or $3.000 to maintain a chemist or physiologist, and furnish him the means of making a continuous, exact, and varied series of experiments and observations bearing on the relations of natural science to agriculture and horticulture. We have the word of such men as Liebig, Pugh, and Johnson that these are the best means yet devised for increasing agricultural knowledge, and I suggest that this Society take the subject under consideration and lend its influence to the undertaking.

We have passed the period of spoliation in agriculture, and it now behooves us, rather than follow our course to its end, to prevent further waste and take warning of the desolate fields of Virginia and the wasted hillsides of New England.

The familiar face of our former guide, philosopher, and friend, as the frontispiece to our last report, suggests that there are other and worthy men, pioneers in our art, whose faces we would like to see similarly engraved, and one sent forth with each report. Overman, Kennicott, and Harkness have passed away from among us, and, knowing the influence they had upon horticulture in our State, even those who knew them not would be pleased to have this memorial of them. I suggest that our Secretary be instructed to examine into the matter and that the Executive Committee be empowered, if the funds of the Society will permit, to secure engraved portraits of the deceased members whom I have mentioned.

The Constitution of our Society makes it the duty of the President to "deliver an annual address upon some subject connected with Horticulture." In the discharge of that duty I shall now call your attention to some remarks upon

The Province of Horticulture.

The term Horticulture, like that of agriculture, is a vague one, and liable to be limited or extended too much. It is specially apt to intrude upon ground properly occupied by agriculture, and occasionally to suffer encroachment in its turn.

Thus Lindley, in his Theory of Horticulture, says, "Horticulture is that branch of knowledge which relates to the cultivation, multiplication, and amelioration of the vegetable kingdom." This, if I understand it rightly, would include all of agriculture proper, or field culture, and consequently includes too much.

Horticulture, etymologically considered, means garden culture; but this is narrowing its meaning too much. But if we take it to mean, what garden culture implies, a nicer or more careful culture, as distinguished from the rougher arts of the field, I believe we get a pretty good conception of its present meaning. Not necessarily perhaps, but in fact, it calls into action higher powers of thought, greater versatility, and more elevated sentiments than agriculture. It may be called the poetry of farming, whilst agriculture is its plain prose.

I would analyze Horticulture after this fashion:

1. Useful, comprising—
   1. Fruit Growing, which includes:
      a. Orchard Culture;
      b. Vineyard Culture;
      c. Small Fruits and their culture.
   2. Vegetable or Market Gardening, including—
      a. Vegetables cultivated for their roots or tubers, as potatoes, onions, beets, &c.

b. Vegetables cultivated for their leaves or stems, as cabbage, asparagus, &c.
c. Vegetables cultivated for their fruit, as tomatoes, melons, peas, &c.
3. Tree Growing, including—
a. Hedging;
b. Belts, or wind breaks;
c. Timber Plantations and Woodlands.
4. Nursery Culture.
II. Ornamental, comprising—
1. Ornamental Tree planting;
2. Flower Gardening;
3. Landscape Gardening.
III. Scientific, comprising collections
1. Of Fruits;
2. Of Vegetables;
3. Of Trees;
4. Of Flowers;
5. Of Plants generally, made not so much for profit or ornamentation, as for experiment and to gratify a scientific taste.

This you will observe is not at all a scientific, or hardly a logical division of the subject. Its only merit, if it has any, is in its adaptation to practice, which separates genera and species without remorse, and places together most widely sundered parts of the vegetable kingdom in obedience to external resemblance, agreeable contrasts, or identity of use. Horticulture, like Topsy, has "growed" in a very disorderly way.

You will observe, farther, that the classes of subjects included under these heads define still more clearly the difference between Horticulture and agriculture. Horticulture comes later in the progress of civilization, and is evidence of greater refinement. In a new country, although settled by a people in an advanced state of civilization, it also comes later as of less prime necessity in the first place, and often requiring a longer period of time between investment and return than new countries with little wealth can afford. It requires amassed wealth for its best success. It assumes permanent homesteads, where men expect to remain and pluck the fruit of their labors.

I will speak briefly of these various departments of Horticulture from a practical rather than a theoretic point of view, calling your attention in the first place to a few preliminary considerations useful to the beginner:

1. Horticulture requires special attention to the choice of soil and climate. The soil for nearly every horticultural product should be warm, deep, dry, and not too rich in *humus*, nor yet too sandy. The chief difficulties of tree growth in the northern part of the State and in states farther north, seem to be rather of the soil than of the climate. The soil, in some cases, is so loose as to freeze to the depth of six feet in Minnesota, and very imperfectly protects any plant standing in it through the winter, whilst so rich as to start a late growth on very little provocation. Soil of a finer and closer texture would evidently be preferable in both

respects. The *humus* of our prairies, moreover, seems to be not entirely wholesome in its original constitution to tree, and probably to many other growths. Our best soils, as a rule, are those of lighter color, on which forest trees are growing, or will most readily grow. The situation for all horticultural purposes should be as elevated as possible above the surrounding country, so as to avoid the late frosts of spring and the early frosts of autumn; and that the winds may have access during the humid, still heats of early summer, which are detrimental to most horticultural growths. Of the advantages of protection, I am not yet confident; but I presume upon the large prairies of Central and Northern Illinois it may be of advantage. But it should be distinctly understood that the summer needs of the fruit tree and its fruits are plenty of air and sunshine. How to reconcile the contradictory demands of summer and winter weather is a difficult problem. Mr. Bragdon, of the *Rural New Yorker*, suggested clumps instead of belts of trees. Professor Turner recommends planting our hedges so as to enclose eighty acre tracts, whose half mile length shall extend north and south, so that the west wind would encounter a hedge every quarter of a mile. These are as good solutions of the difficulty as any I have met.

2. Horticulture demands foresight. The question of a market for one's products, of the varieties of fruit that will be profitable twenty years hence, but that must be chosen and planted this year; of the future effect of a clump of trees, and the prospective value of a given kind for lumber; these and many other points involving one's future prosperity and success must all be forecast by one who would proceed wisely and well. Lord Bacon said that "he who hath a wife and children hath given hostages to fortune." Hardly less is this the case with him who plants an orchard, a vineyard, or a forest.

3. Horticulture, in all or nearly all its branches, demands very deep and thorough preparation of the soil for its best success. Shallow culture on most soils is to be deprecated in agriculture, much more so in Horticulture, where the ground in some cases will not be replanted for many years, and where, in any event, the expense of seeding and culture per acre is much greater than in agriculture. But where deep preparation of ground is for any reason omitted, continuous stirring of the surface in clay soils, at least, has an excellent result, and probably for many smaller plants is a good, if not sufficient substitute. Premising this much, I will speak

I.

Of Useful Horticulture,

where the main object is utility and profit: and under this,

1. Of Fruit Growing, the branch of Horticulture most attractive to the masses of the people, and perhaps, as a rule, the most profitable.

a. Orchard Fruits comprise the apple, pear, quince, peach, nectarine, cherry, apricot, and occasionally other fruits growing on trees planted in order in a separate plantation or field. Of these we must say, in their favor, that once established they require comparatively little care in their after culture, and in many cases yield their fruit year by year

gratuitously. On the other hand, they are less easily protected from sudden changes of weather than vines or shrubs, or from the attacks of insects and diseases.

Of these orchard fruits, the Apple is in most civilized countries the most important, and probably as ancient as any. It is found in the remains of the lake dwellings of the Neolithic period, apparently cultivated. Its name, as found in most Indo-European languages, is derived from a common root, Ab., Ap., Al., Av., Af., denoting its transmission from the place of origin through numerous nations of kindred tongues. It is commonly supposed to be descended from the wild crab of Europe; but the Siberian crabs, and very likely the Russian apples, are the descendants, in part at least, of the *Pyrus prunifolia.* It is grown in a wide range of climate in China, Japan, and Northern Asia, in nearly the whole of Europe and the north of Africa, in North America and in many parts of South America, particularly in Southern Chili. On our own continent it grows and bears fruit as far south as Florida; and the tree grows at Sitka, where it blossoms the first of June, but does not mature its fruit, although the leaves were untouched by frost as late as November. The apple is used for a variety of purposes, and the fruit can be kept longer and with less trouble than any other. It is not an article of luxury in most American communities, but a healthful and necessary article of diet. Hence it is one of the safest investments in Horticulture. The profits arising from its culture may not be as large as from other orchard fruits, but they are more certain and attended with less expense, as the apple orchard requires little labor to keep it in good condition. It is therefore, and justly, the favorite fruit of the care-avoiding farmer.

The Pear is also widely distributed, but gives evidence in a greater variety of names of having been domesticated by more different nations. But it seems less flexible in its organization, and in the New World, at least, not to withstand extremes of humidity and dryness, of heat and cold nearly so well as the apple. But it is a luscious and valuable fruit, with some strong points in its ability to resist some of the insects and diseases that affect the apple, and the value of the well-ripened fruit promises a goodly reward to the successful cultivator. But the pear grower must accept the somewhat rash philosophy of James Graham, of Montrose:

> "He either fears his fate too much,
> Or his deserts are small,
> Who dares not put it to the touch
> To win or lose it all."

For blight is the swift destruction of many pear trees. I suppose the ultimate causes of pear blight are climatic extremes and a retentive subsoil, and that when we shall better understand these we can grow pears.

The Quince may be grown at a profit, at least in small quantities and in the southern part of the State, in the damper and richer soils. Most cultivators in the central and northern part of the State have failed with it; but the success of a few, and the fact that it blossoms late and so avoids frost, lead me to believe that it can and will be more grown

when better understood. It should be grown as a bush, not with a trunk.

The Peach, in the south half of the State at least, is sufficiently hardy to be cultivated with moderate profit in many localities, and in some places large returns may be realized. This fruit, which is referred to by Confucius, and even, says De Candolle, mentioned as early as the tenth century before Christ, is believed by later authors to be a modified form of the almond. For growing the peach the most favorable points should be selected; such as the heights of the bluffs along our great rivers, the tops of the hills along the Grand Chain, the mounds about Pana, and other elevated points. The varieties having large blossoms, I may add, seem to be almost invariably the hardiest; either the large petal forms a more complete protection, or is evidence of greater vitality. The fact of the large blossom, I suppose, accounts for the superior hardiness of seedling trees, and it is probable that a selection of the improved varieties with large blossoms would give good results and be worth trying on the northern limits of the fruit region. Downing names over thirty such varieties, besides the serrate kinds.

The Cherry, in one or more of its varieties, is grown throughout the State, and occasionally with considerable profit. The hardy varieties of Early Richmond and Common Morello may be grown almost anywhere and under great neglect, though I have seen few fruits more improved by manure than the Early Richmond. The sweet cherries can be grown in many localities where the subsoil is open and the upper soil not too rich. But the cherry, I apprehend, needs a cooler summer than ours for the best results, and the buds of the sweet cherry are often nipped by the frost. Picking the cherry is a practical difficulty to be considered in estimating its profits.

The Plum, in spite of the commendations of our State Horticulturist, I find quite tender in the bud, except in the Chickasaw, from whose varieties I expect our best and most complete success in plum growing, just as we have found to be the case with native rather than foreign grapes.

The Apricot and the Nectarine are of so little general interest that I pass them over.

One word, however, as to a general principle in pruning, applicable to a greater or less extent, I believe, to fruit trees in all parts of our State. I put it in the language of P. J. Berckmans, of Augusta, Georgia:

"The pyramidal form is the only one fitted for a young tree and for all climates. The old habit of pruning trees so as to give them a round and spreading head is very defective, and all rational cultivators condemn it. By pruning a tree in pyramidal shape, we have—1st. It covers and protects the bark all over the body; 2d. It gives strength to the tree by a regular distribution of the sap; 3d. The fruit is equally divided, and its weight being equal, the tree will not incline towards the heaviest side, as in badly trained trees; 4th. The renewing of the wood is done without being obliged to cut away half the tree, as is often the case,

especially in the peach; 5th. It allows the tree, although furnished with all the necessary shoots and foliage (being in a compact form) to withstand the storms which prostrate and destroy so many badly pruned trees. Never allow the tree to have a double leader, nor a branch to outgrow the others."

I will only add, that in my own practice during the last eight or ten years, I have found this mode of pruning more satisfactory than any other, and satisfactory in proportion to the faithfulness with which its theory was carried out. Some varieties, with only an annual pruning, are difficult to make good pyramids of; but even an approximation to this form is an advantage as far as it goes. The splitting down of old peach trees cut off "boot-leg high," as was the precept ten years ago in the Southern Illinois orchard planting, and the rotting cavities in the "crotches" of our old apple trees, are sufficient to condemn the old practice of cutting out the leader. It may answer for regions of cold and cloudy summers, where every ray of sunlight must be economized, but certainly not in our clear dry atmosphere.

b. Vineyard Culture during the last ten years has been wonderfully advanced, both by the discovery and dissemination of more reliable varieties and in a better teaching and practice of modes of culture. The grape is a profitable fruit, but demands inexorably high culture, timely pruning, training, and pinching. Yet its culture is specially attractive to the cultivated taste, and remunerative to the good manager.

The American grape is a fruit of wide range. The frost grape grows as far north as latitude 50°, three degrees farther north than Quebec, on the Saskatchawan; and the Southern Fox and summer grapes go down, I believe, to the southern extremity of the United States. Consequently, if we can guard against some of the extremes of cold, which are injurious to the vine, by covering with loose earth, or even laying close to the ground, and can secure the leaves and fruit against the cool nights and hot humidity of the growing season, we can grow grapes with great certainty and success nearly everywhere.

But this "*if*" contains a great deal. Our continental climate is one of great extremes of heat and cold, humidity and dryness. Humboldt, in his "Cosmos," intimates that we are fated, as Dante says in the third canto of the "Purgatorio":

> "To suffer torments both of cold and heat,"

or, as Milton has it, condemned

> "To feel by turn the bitter change
> Of fierce extremes; extremes by change more fierce."

We can not fully guard against these extremes, especially the saturation of soil and atmosphere that sometimes takes place in the season of most rapid growth.

It is a curious fact, by the way, that some of the finest fruit is grown in these regions of greatest extremes. The finest apples of Russia are said to come from the Crimea where the thermometer goes up to 100° of summer heat, and the cold of winter is intense. The like is true of the finest fruit countries of Asia, which are all, I believe, continental in their climates.

c. The *Small Fruits* including under that name the strawberry, raspberry, blackberry, currant, and gooseberry, (and we might include the cranberry and whortleberry,) are in many respects desirable and valuable crops. The strawberry, from its early returns, fruiting heavily one year from planting, is a desirable crop for the person of small means, or for any one desiring early returns. As it is a low plant, its conditions can be more easily controlled than those of any other fruit by mulching and covering. The raspberry and blackberry bear some fruit in the second year, sometimes amounting to a good crop, and are desirable for that reason. The currant and gooseberry come later into bearing, and are valuable chiefly for their involving small expense in culture and being hardy and productive, rather than high-priced. I regard the strawberry as probable the most valuable of the small fruits, and the raspberry least so.

2. Vegetable or Market Gardening near the cities and large towns and to a certain extent where there are good facilities for shipping, is a remunerative though a laborious business, and is associated to a certain extent with fruit growing to advantage. In many cases it borders close upon ordinary agriculture, as in the large fields of Irish potatoes grown in the American Bottom near St. Louis and elsewhere. But in many instances again it requires the best skill of the horticulturist for success.

a. Vegetables grown for their *roots* or tubers are such as the beet, carrot, onion, parsnip, potato, radish, ruta-baga, sweet potato, and turnip.

b. Vegetables grown for their *tops* or stems, are such as the asparagus, cabbage, cauliflower, celery, and rhubarb.

c. Vegetables grown for their *fruit* are the bean, corn, cucumber, egg-plant, melon, pea, squash, tomato, and watermelon.

I have no practical knowledge of market gardening, but observing others, I find the usual results of success and failure, according to the ability and energy put into the work. The care required is considerable, and at times must be unremitting, as when hot-beds are in danger. A deal of exposure must be sometimes undertaken in order to plant at the most propitious time, and hours too early to be healthful must be kept. But earnestly followed it seems to be profitable, and I know of more than one fortune founded on market gardening. It gives very early returns: the time between sowing radishes and selling them is short.

Market gardening involves the whole question of the value of commercial and other fertilizers, which are specially necessary in its prosecution, but which I cannot stop to speak of here.

3. Tree Growing for timber and other purposes I put as a separate branch of Horticulture. It comes late in horticultural progress, and does not look to very immediate results. Yet the attention given to it by governments and individuals in the Old World, evinces its importance and warns us to provide for the future of our own country. We should have trees growing on every declivity too steep for profitable cultivation, and on the west side, at least, of every farm.

a. Hedging, under the late impetus it has received from the high prices of fencing, and from the better knowledge of its management is

getting on satisfactorily, and the abundant and cheap supply of Osage orange plants, is fast surrounding our prairie, and even our forest farms with a living wall. The Osage orange is "the only wear," and, so far north as its culture can be safely carried, seems to be the best. Very beautiful as an ornamental hedge, and perhaps sufficient for a fence, is the *Pyrus Japonica.* Professor Turner recommends the barberry for a similar purpose.

As in other horticulture, deep and thorough preparation of ground, careful planting, and clean cultivation are prime necessities. Next comes the pruning, concerning which there is a variety of theories. Mr. Meehan advises to prune the hedge so that a section of it shall be an equilateral triangle. Dr. Hull advises shortening in and making a perpendicular of either side. I have seen no practical example of either of these. The process of bending over and interweaving the tops of the plants in the line of the hedge, a few inches above ground, has some advocates, and produces some tolerable results, but how permanent they will be is not known. Cutting down the hedge and growing a mass of sprouts from the stumps, has proved generally a failure. The plashing process, or half cutting off the plants and bending them down at an angle of 30 degrees with the line of the hedge, is making some ugly, but efficient fences.

b. Belts or Wind Breaks have been highly extolled and somewhat planted in our prairies. A few have shown their faith by their works, among whom are our friends Dunlap and Edwards, Minier and others. For these belts immediate utility and rapid growth are generally prime requisites, and hence trees producing an inferior quality of timber, such as the soft-maple, cottonwood, white willow, etc., are planted. But it is evident that evergreens and some of the better deciduous trees should be planted under their lee, to ultimately replace them.

c. One of the best investments that can now be made, if you can wait until 1890 or 1900 to "realize," is in *Timber Plantations.* European larch is now all the rage, but I apprehend will not be nearly so satisfactory in this climate as in Europe; but there are plenty of native and foreign species well proven, that will be of high value for lumber. Black walnut, Red cedar, and Norway spruce, are trees combining considerable rapidity of growth with high value as timber. Black Locust is still valuable with me, being exempt from the attacks of the borer on the white soil, although, for many years destroyed on the black soil, a few miles away. Prince says it escapes on the calcareous soils. The catalpa and Osage orange receive high commendations, and many others that I will not now stop to enumerate, but that ought to be carefully enumerated in an act to encourage the planting of timber trees.

4. It would be proper under the head of useful Horticulture, to speak of NURSERY management as an important and often profitable branch of this pleasing art; but my space will hardly permit. The business requires close personal attention, great care and accuracy, and a thorough knowledge of a great variety of plants, and their culture; so much in fact that few men are able to manage successfully a general nursery, except by very thorough division and organization of labor.

Such men as Ellwanger and Barry, B. K. Bliss, and others nearer home seem to understand it.

II.

ORNAMENTAL HORTICULTURE,

though very attractive, of course, makes comparatively slow advance in our new country. It appeals to the æsthetic part of our nature, and, therefore, can only receive due attention after hunger is satisfied, and the more immediate necessities of life provided for.

1. ORNAMENTAL TREE planting, with the exception perhaps of some faint attempt at flower growing—the pathetic effort of a wife or daughter to redeem the arid desert of a corn and hog-grower's front yard, naturally comes first. An ornamental tree or shrub, in a farmer's eye has the immense advantage after once established, of taking care of itself. And this leads me to say, as N. P. Willis has before me, that trees, or strong shrubs, and grass are the cheapest and fairest ornamentation.

In ornamental tree planting we may plant many trees not very valuable on account of their beauty of form or foliage. The white elm is a conspicuous example of this kind. The linden is one of the finest, to my mind; and the white and burr oak are magnificent species, combining the picturesque with the beautiful.

The study of these trees, singly and in mass; their characteristics of height and outline; shape of foliage; its shade of green and its autumn colors, as well as the effect of their blossoming, are important as preliminary to the grouping and contrasts of landscape gardening.

As a rule, trees of heavy foliage and dense shadow, like the catalpa and linden, with pendant rather than horizontal spray, as the white elm and the willow, and of varied tints, as the locust, in the different shades of its younger and older leaves, or the sugar maple in its change from summer to autumn hues, are most admirable for planting singly.

2. FLOWER GARDENING I can only commend in its results. If I had the time, I have not the experience to speak merely of even a few of the wide range of flower and foliage plants that adorn our gardens, our sitting-room windows, our green-houses and conservatories. Modern art has compassed the globe, and bronght to our homes the floral treasures of ancient Asia and the isles of the sea. But flower culture, attractive as it is to the more refined tastes of woman, and all who sympathize with her, commends itself to us as one of the most innocent of amusements, and one of the most instructive and refining of pursuits. It has too—though that seems little thought of, its market value; and the increasing demand for flowers by those who can not or will not grow them, will give an added interest to the occupation; and the early roses of South Pass go to Chicago markets with her early fruits.

3. LANDSCAPE GARDENING may be said to include the whole, of which ornamental trees and flower culture are parts. Here we bring under consideration the configuration of the surface; the surrounding landscape; the effects of grouping and massing trees, shrubs, and flowers of different colors and shades of color; the massing of single colors, and

uniform outlines, and I know not how many intricate æsthetic questions. For Landscape Gardening is painting in living colors. Longfellow addressing the children at their play, said

"Ye are better than all the poems
That were ever sung or said,
For ye are the living poems,
And all the rest are dead."

Landscape Gardening is better than the painter's work in the same way. It is the reality of which the other is but the shadow. And, though the breadth of surface and the means of carrying out its more elaborate designs are generally beyond private means, there is yet a great neglect of what might be done easily and cheaply, with only a little foresight and thought. A little clump of trees planted on an eminence, costs but a few dollars, yet it may be a point of beauty in the landscape, for a lifetime. A chance elm that has sprung up in a distant corner of the farm, may be staked about and protected in a few minutes time, yet hangs like a green cloud on the horizon for long years to come. Still more will a little work effect great things in the clearing of woodlands, as the reader of Mr. Sargent's experience in his edition of Downing's Landscape Gardening may see. The trees that may be saved, and in one way or another made to subserve the adornment of a home, are grown for our purpose and we gain a generation's time, and see with the eyes of our children.

Chevreul, in his Laws of Contrast of Color, gives some applications to Horticulture to which I am sorry to be only able to call your attention at this time. It is the first attempt I have seen to instruct us in the harmonies and contrasts of color and shades of color, &c., in landscape gardening.

III.

SCIENTIFIC HORTICULTURE,

if I may be allowed that expression, is carried on with the primary purpose of increasing knowledge. It aims at the truth, whilst Ornamental Horticulture seeks the beautiful, and Useful Horticulture the good.

1. Of FRUITS we already have fine collections begun in our State by Mr. E. H. Skinner of Rockford, A. M. Lawver of South Pass, our Industrial University, and others. The University has 1,200 varieties of apples, and has just received scions of 400 varieties of pears. A late telegram informs us that Commissioner Capron of the Agricultural Department has received scions of 400 varieties of Russian apples. I have applied, on behalf of this Society and of the Industrial University, for specimens of them, and hope that we may be favored.

2. VEGETABLE COLLECTIONS are less numerous in the West, so far as I am acquainted; but our horticultural friends in Massachusetts and other Eastern States seem to have made large collections and comparisons of the varieties of the potato, bean, pea, &c.

3. COLLECTIONS of TREES are begun and form an attractive pursuit to many minds. Arranged botanically, even a single straight row of trees, representing the more common and hardy species, may be made instructive and interesting. The arboretum of the grounds of the Depart-

ment of Agriculture at Washington, though new and presenting as yet no fine large specimens, is one of the most complete in the world, Commissioner Capron informs me, and is a worthy monument of that staunch and staid horticulturist, William Saunders. "*Exegit monumentum ære perennius.*" The order of arrangement is given on page 122 of the Report of the Commissioner of Agriculture for 1868, and is worth studying and imitating. Mr. Saunders, as he expressed it, "laid down Gray's Manual on the ground." An arboretum is embraced among the plans of the Horticultural Department at the Industrial University of our State, and will cover about ten acres.

4. Collections of Flowers are pretty numerous, but I do not know any at all complete and well maintained attempts at variety in this direction. As in vegetables, amateurs follow out specialties; one making a collection of roses, another of pansies, &c.

5. General Collections of plants, or botanical gardens, are beyond the reach of most individuals, and quite rare, in this country, at any rate. Probably the finest in the West is that of Henry Shaw, a wealthy citizen of St. Louis, who is devoting a part of his large means to the planting of an arboretum of over twenty-five acres and a fruticetum, and the collecting of numerous tropical fruits. I spent a few hours at the place some days since, and saw some small part of one of the greatest horticultural collections in the country.

I have thus spoken briefly and imperfectly, if at considerable length, of many points in the great trinity of Useful, Ornamental, and Scientific Horticulture, holding it to be best for exact ideas that the whole ground be mapped out plainly, even if not correctly.

I need not much insist upon the dignity and attractiveness of this pursuit before this audience. In all time, Horticulture has been the favorite pursuit of the more advanced races and of the foremost men. It was, we are told, the occupation of our first parents, and our second ancestor planted a vineyard, if he did not make an altogether commendable use of the product. The hanging gardens of Babylon were the wonder of the ancient world, and the sculptures of old Egypt reveal the esteem in which the art was held in that dim and distant time. The Homeric poems with their Garden of Alcinous, whose "fruit never perishes, nor does it fail winter nor summer, lasting throughout the whole year; but the west wind ever blowing makes some bud forth and ripens others"—their Isle of Calypso, where "four fountains flowed in succession, with white water, turned near one another, each in different ways, but around there flourished soft meadows of violets and of parsley"—bear witness of other and ancient days, as did Theocritus, and Virgil, and Horace, in their time.

It was Lord Bacon who said: "God Almighty first planted a garden," and, indeed, it is the purest of all human pleasures. It is the greatest refreshment to the spirits of man, without which buildings and palaces are but gross handiworks; and a man shall ever see that when ages grow to civility and elegance, men come to build stately sooner than to garden finely, as if gardening were the greater perfection."

Thomas Jefferson—one of the greatest and certainly the most influential in his own and subsequent generations of American statesmen, whose declaration of the absolute equality of man hung on the horizon of the slave power's hopes like the "mene tekel upharsin" on the wall of the feasting Belshazzar, and won the battles of the second as well as the first revolution—kept a record through the eight years of his presidency of the first appearance and the disappearance of the various vegetables in the Washington markets, and spent his rural hours at Monticello in gardening. Our veteran poet, Bryant—it seems to run in the family—delights in tree planting, and wrote the poem, "The Planting of the Apple Tree." Henry Ward Beecher I respect rather more as a horticulturist than a theologian. Hawthorne, Emerson, Lowell. Mitchell, and many others, living and dead, of our eminent men, have a warm side towards Horticulture.

"Thus," says Alcott in his Tablets, "we associate gardens and orchards with the perfect condition of mankind. Gardeners ourselves by birthright, we also mythologize and plant our Edens in the east of us like our ancestors—the sacredness of earth and heaven still clinging to the tiller of the ground. Him we esteem the pattern man, the most favored of any. His labors have a charming innocency. They yield the gains of self-respect denied to other callings. His is an occupation friendly to every virtue: the freest of any from covetousness and debasing cares. It is full of honest profits, manly labors, and brings and administers all necessaries, gives the largest leisure for study and recreation, while it answers most tenderly the hospitalities of friendship and the claims of home. The delight of children, the pastime of woman, the privilege of the poor man, as it is the ornament of the gentleman, the praise of the scholar, the security of the citizen; it places man in his truest relations to the world in which he lives. And he who is insensible to these pleasures must lack some chord in the harp of humanity, worshiping, if he worship, at some strange shrine."

"Rooms Illinois State Agricultural Society,
Wednesday, 5th January, 1870.

"The Board being in session, the Secretary presented a communication from the Secretary of the State Horticultural Society, and embodying resolutions of the latter proposing to join the next State Fair on certain conditions therein stated, which, on motion of Mr. McConnell, were referred to a committee of three, who were instructed to report as soon as convenient.

The President appointed Messrs. McConnell, Cobb, and Emery such committee.

The committee appointed to consider and report upon the proposition of the State Horticultural Society, in regard to the next Fair, reported through their Chairman, Mr. Cobb, as follows:

Your committee, to whom was referred the communication and resolutions of the State Horticultural Society, would respectfully report as follows:

While we fully appreciate the importance and value of the horticultural interest of the State, and the desirability of union of action between the State Agricultural Society and the State Horticultural Society, in order to the best development of said interest, and are willing to meet the Executive Committee, or a special committee of the Horticultural Society, in the preparation of a premium list for the next annual Fair,

Resolved, That this Society can not with propriety accede to the propositions as embraced in their resolutions.

Resolved, That this Board are willing to meet a committee of conference from the Horticultural Society in the preparation of a premium list, and suggest Thursday P. M. as the time for such conference.

Resolved, That the action of this Board be communicated to the proper officers of the Horticultural Society at once.

E. COBB,
A. B. McCONNELL,
H. D. EMERY,
Committee."

The report of the committee was adopted by the Board of the Illinois State Agricultural Society.

The President called for the Secretary's Report, which was read as follows:

REPORT OF SECRETARY.

At the close of the last annual meeting, it was agreed between Mr. Flagg and myself that, as he had collected and prepared the matter in manuscript thus far for the volume of Transactions for 1869, he should complete the editorial work of the volume. Indeed, no other one could do the work without performing very much extra labor, and consequently involving extra expense. I have, therefore, nothing to report relative to that volume.

The first of my official duties was the calling a meeting of the Executive Committee of this Society, by order of the President, at the Industrial University Building, and in recording the action taken thereat, which I report as follows, viz:

A meeting of the Executive Committee of the Illinois State Horticultural Society was held in the room of the Professor of Agriculture, in the Industrial University, Champaign, March 8th.

Present: Hon. W. C. Flagg, President; O. B. Galusha, Secretary; A. M. Brown, T. McWhorter, and Elmer Baldwin.

A report from the Treasurer showed the entire available funds of the Society to be $2,850.58.

The President stated that he thought the volume of Transactions for 1869 would cost about the same for printing as last year, or about $1,300.

Resolutions were adopted to print the minutes of the Northern Illinois Horticultural Society with ours, they paying therefor the sum of $175, and receiving paper-bound copies for members of that Society, who are not members of the State Society, and bound volumes for those

who are members of both societies. Mr. S. Edwards, President of the Northern Horticultural Society, pledged the requisite amount.

On the pledge of Mr. Daggy, President of the Central Illinois Horticultural Society, it was voted to incorporate the minutes of that Society for the sum of $65, with the same regulations in respect to distribution of copies.

On motion of Judge Brown, it was

Resolved, That we employ Dr. E. S. Hull for the current year, as State Horticulturist, at a compensation of $700, and that he shall be expected to make as thorough investigations at home by the microscope and otherwise of insects injurious to fruits and vegetation; also, of the various plant and fruit diseases and their remedies, and to make as frequent excursions as he can, for the purpose of observations in the orchards in various parts of the State.

The sum of $100 was voted to the Secretary for stationery and expenses for the current year.

A resolution was adopted limiting the expenses of the Ad-Interim Committee (to be paid out of our treasury) to the sum of $150.

The time of holding the next annual meeting of the Society at Galesburg was fixed for December 13, 14, 15, and 16.

I am informed by the former Secretary that there is no book furnished by the Society in which to keep its records. It seems very important that the Secretary should keep a concise record of the times and places of all annual and extra meetings and fairs of the Society, as well as of all meetings of the Executive Committees, as well as of all orders drawn on the Treasurer, with their dates and the purposes for which they were drawn.

I recommend, therefore, that he be authorized to purchase a substantially bound record book for these purposes.

In view of the delay in the publication of the volume for 1869, and of the fact that the funds of the Society are nearly or quite exhausted, I have taken measures to secure the *early* publication of the next volume and at *much less expense* to the Society. We are also to have 500 copies bound in muslin and 500 in paper covers, instead of 300 in muslin and 700 in paper, as heretofore.

I have assumed the responsibility of requesting from the Governor 1,000 copies of the Report of the State Entomologist, in sheet form, for binding in our volume. This seems especially desirable, since upon the subject of entomology, perhaps, more than any other, the horticulturist needs light. His success depends more upon his ability to ward off, or combat and overcome the hordes of his insect enemies, than upon his knowledge of soils, of botany, or vegetable physiology.

The publication of our transactions at an unusually early day will shut out from the volume the minutes and papers of several kindred societies that have heretofore published with us. This result is to be regretted, as it must detract from the interest and value of the volume. Yet we cannot consistently wait for them, and neither the officers or

members of these societies ask it. I trust that hereafter the Northern and Central Illinois societies especially will arrange their meetings, so that their "transactions" may be ready for publication conjointly with ours.

My receipts for the year have been as follows:

From H. L. Brush, Julius Avery (since deceased), R. F. Bower, P. S. Peterson, W. P. Pierson and E. W. Irish, (each two dollars) for memberships	$12.00
From Treasurer, on account of Ad-Interim expenses	100.00
" " " " salary	150.00
" " " " office expenses	50.00
	$312.00

My expenditures are as follows:

To Committee Ad-Interim—		
	Parker Earle	$41.75
	D. B. Wier	41.00
O. B. Galusha, including $13.50 expended for Committee jointly		44.50
		$127.25
Office expenses, as per Bill of Items (herewith)		$91.83

RECAPITULATION.

Amount expended on Ad-Int. Com. account		$127.25
" received " "		100.00
Balance due " "		$27.25
Amount of office expenses	$91.83	
" received on expense account	50.00	
Balance due on expense account		$41.83
Amount of salary	$300.00	
Received on salary	150.00	
Balance on salary account		$150.00
		$219.08
Received for memberships		12.00
Balance due on all accounts		$207.08

The warrants signed by me are the following:

For D. B. Wier (Ad-Int. Com.)	$ 9.00
" C. V. Riley	65.00
" E. S. Hull	200.00
" O. B. Galusha	100.00
" "	100.00

For E. S. Hull 350.00
" W. C. Flagg 40.00
" O. B. Galusha 50.00
" R. P. Studley & Co. 1,553.89

I herewith present, for the examination of the Auditing Committee, bills of items as required by the by-laws, for expenses as Secretary and member of Committee ad-Interim, having been appointed on that committee in place of Mr. Cochran, whose health would not allow him to attend to its duties.

All which is respectfully submitted.

O. B. GALUSHA, Secretary.

The Treasurer, Mr. Huggins, presented the following statement of the finances of the Society:

REPORT OF TREASURER.

Statement of Treasurer of the Illinois Horticultural Society.

RECEIPTS.

Balance in hand per statement of account Dec. 15, 1869	$1,174.58
Membership Fees for 1869-70	252.00
Donation from the State for 1870	2,000.00
Cash received frem John Davis, Treasurer Central Ill. Hort. Society	65.00
Cash received from E. H. Skinner, Treasurer Northern Ill. Hort. Society	150.00
Total	$3,641.58

EXPENDITURES.

Cash paid as follows:

Dec. 14, 1869,	W. C. Flagg, on order of the President	$	6.00
" " "	E. Baldwin, " " " " "		5.00
" " "	T. McWhorter, " " " " "		5.00
" " "	A. M. Brown, " " " " "		5.00
" " "	R. P. Studley & Co., " " " "		40.00
" " "	L. A. Parks & Co., " " " "		35.00
" " "	W. C. Flagg, " " " "		75.00
" " "	W. C. Flagg, " " " "		50.00
Dec. 16, "	George Buckley, " " " "		20.00
" 17, "	Sam'l Edwards, " " " "		43.60
" " "	E. S. Hull, " " " "		107.00
" " "	Winter Bros., " " " "		7.00
" 22 "	Thos. Meehan, " " " "		120.00
" " "	George Buckley, " " " "		30.00
March 19, 1870,	D. B. Wier, " " " "		9.00
" " "	O. B. Galusha, " " " "		100.00
" 28, "	C. V. Riley, " " " "		65.00
April 23, "	E. S. Hull, " " " "		350.00
July 30, "	O. B. Galusha, " " " "		100.00
Nov. 18, "	E. S. Hull, " " " "		200.00
" " "	O. B. Galusha, " " " "		50.00
" " "	W. C. Flagg, " " " "		40,00
Dec. 10, "	R. P. Studley & Co. " " " "		1,553.89
" 13, "	O. B. Galusha, " " " "		50.00
	Whole amount		$3,066.49
	Leaving in the Treasury the sum of		575.09

GALESBURG, December 13, 1870.

JONA. HUGGINS, TREASURER.

A. M. Brown moved that the President appoint Committees on President's Address; Auditing; on Fruits; on Wines, and on Final Resolutions. The motion prevailed, and President Flagg announced the following named gentlemen as members of the respectively named committees:

President's Address.—A. M. Brown, T. Mc Whorter, E. Daggy.
Auditing Committee,—S. G. Minkler, L. Ellsworth, H. J. Hyde.
Fruits.—J. A. Warder, A. Bryant, A. G. Humphrey.
Final Resolutions.—H. D. Emery, P. R. Wright, H. Vickroy.

On motion, the Reports of Secretary and Treasurer were referred to the Auditing Committee.

The hours of meeting were fixed at 9 A. M., 2 P. M., and 7 P. M.

The Reports of Vice-Presidents being next in order, Mr. Daggy moved that these be referred, without reading, to the Secretary, for publication. This motion, not being favorably received, was withdrawn by the mover. Vice-President L. Woodward, of the First District, then presented his report, which, at his request, was read by Assistant Secretary Dunlap.

REPORT OF THE FIRST HORTICULTURAL DISTRICT.

Mr. President and Brethren: I will endeavor to make my report short, but will try to give a brief synopsis of Horticulture in my district.

There is, perhaps, about one third of our district that is a timber soil which has a mixture of clay, sand and gravel, with more or less limestone. In some parts, more especially on the higher points of land, are found boulders of granite, sandstone, etc. The balance prairie, with a surface soil of black sandy loam; the northern part has mostly a gravelly subsoil, while the eastern and southern parts are clay subsoil.

In our locality, at Marengo and vicinity, the fruit crop was cut off this season. The cause we attribute to the severe freeze in October, 1869, and the dry condition of the soil at the time, while the eastern and southern parts were blessed with good crops of fruit, more especially along Fox River below Elgin, and in De Kalb County, and at other points; the clay subsoil being better adapted to fruit, especially the apple, pear, and plum.

The small fruits failed to ripen, in consequence of the severe drouth during the months of May, June, and July, although some of our most thorough cultivators succeeded in ripening a goodly portion of their crops of strawberries, raspberries, and grapes. Among these were Messrs. Thos. Ford & Son, James Crow of Crystal Lake, and others in our vicinity, while a larger part of the general crop dried on the vines and bushes, before fully ripe. The nurserymen and growers of small fruits at Marengo, succeeded in a fair growth of trees, vines, shrubbery, etc., by continuous cultivation during the dry and extremely hot weather.

The greater part of our seedlings are grown on new ground, in our

deep, rich prairie soil, which, if properly cared for, gives a growth sufficiently large for either budding or grafting at one year's growth, which is preferred by the most of nurserymen. We prefer grafting at the collar of the root, using one root to the graft, leaving the root four to five inches in length, though there may be exceptions. Where the roots are long and fibrous the second cut may be used, and, if equally strong, they afford a strong growth to the graft the first year, which invariably insures a tree with strong, healthy growth, and more liable to ripen its wood before the setting in of winter.

In setting out orchards of apple, pear, plum, and cherry trees, we prefer to have the ground plowed at least ten inches deep, then dig a hole sufficiently large to receive the roots as they naturally grew, wet the roots (with water not too cold) and use the hand in putting in fine earth around them. Be careful to place all fibrous roots in their natural position, filling up, and pressing down with the foot, until the tree stands firm in the ground, leaving the tree one or two inches lower than when it stood in the nursery, then mulch *well* with coarse manure, and cultivate the ground with some hoed crop. On prairie or level ground, more especially where there is a clay subsoil, (unless the ground is properly drained with tile or other material) we would recommend in plowing to turn the furrow towards the row each year, until the ridge where the row stands is twelve to eighteen inches high, leaving a ditch between the rows, to carry off surface water. This mode of cultivation not only serves to make the tree stand erect and keep the roots dry shod, giving the tree nearly all the strength of the surface soil, but prevents the starting of the sap in the roots the first sunny days in spring, thus preventing the blossoms from bursting forth before the late frosts in spring, and is more likely to insure a good crop. It also keeps the dense freezing from the roots of the tree in even the coldest winter. I have seen in the orchard of James A. Wakeman, sixteen miles west of Chicago, on the prairie, with a stiff clay subsoil, even such varieties as the Rhode Island Greening, Baldwin, and Spitzenberg succeeding quite well when grown with the above mode of cultivation, although these varieties have been found too tender to succeed well in general orchard culture in this district.

There is a strong growing interest in this district, as well as in the whole Northwest, in regard to Siberian Crab apples, but this question has been so well discussed before the public and by able men, that there is little need of my saying much about it; but I will say that not only the leading varieties, but many new varieties are bound to become popular, as they are gaining in favor very fast throughout the Northwest. The fruit growers and kitchen gardeners, as well as farmers, may plant one of these iron-clad trees (if we may be allowed the expression), and it will stay with them, and they need not replace it every few years, as has been the practice with tender varieties of fruit. The same may be said of plums. The Townsend, or Miner, and other hardy varieties will follow suit, as it is a positive fact that we must propagate fruit of varieties that will ripen their wood early in autumn, shed their foliage, and be prepared for the sudden changes of our Northwestern climate at

the setting in of winter. Why is it that the Early Richmond cherry has become so popular in the vicinity of Chicago, and in fact the whole Northwest? It is a sour cherry and of medium size, and I might say inferior to most of the sweet cherries that are grown in a more temperate climate. We answer: we can grow the fruit bountifully, and depend on a crop as surely as we can on our corn crop. Messrs. D. S. Dunning & Son, of Jefferson, Cook County, have grown annual crops, as is well known, and realized from $1,000 to $2,000 per year net in Chicago market. The tree ripens its wood early in autumn, and is prepared for almost any changes of weather, and meets Jack Frost square in the face. For many years we tried the fine varieties of sweet cherries, but all in vain. Then shall we not profit by these examples in raising apples, plums and other fruits? Or shall shall we carry the bag of corn to mill, with the corn in one end of the bag and a stone in the other end to make the balance?

The English Morello cherry must not be forgotten, as it is a larger cherry than the Richmond, has a better pulp, and is preferred by some for canning purposes. It is a good bearer, and does well on the Mahaleb stock.

There are a few varieties of pears that flourish in some parts of our district. We would prefer standard trees, or those that are budded or grafted on the pear root or stock. Pears seem to do the best on a stiff clay and gravelly subsoil, as we find on our Fair tables in McHenry County some very fine specimens of the pear that were grown in Woodstock and other parts of our district.

In the planting and growing of ornamental trees, shrubs, and plants, there is a great and increasing interest. It may be safe to state that this horticultural district takes the lead, in this department, of any in the State. The decoration of homes by tree planting is among the hopeful signs of improvement in society. Some enterprising gentlemen have, with commendable energy, gone extensively into the propagation of evergreens and forest trees—a branch of production of not only individual, but of great public interest. The production of the European larch, the white pine and other timber trees, on so extensive a scale as is already being done by various parties in our district, is worthy of mention as among the most useful enterprises that has been undertaken in the great West. The European larch seems to take the preference rather than the American, as it adapts itself to almost every variety of soil. We have it growing on a dry sand and gravel knoll, and again on a low damp sandy soil, the former being fully equal to the latter in growth and beauty; and we feel safe in saying, that, while it is one of our best timber trees, it is also bound to become one of the leading varieties for ornament. In choosing pines, we would recommend the native white for timber culture as well as for lawns and other ornamental purposes, and at the same time the Austrian, Scotch, and other leading varieties should not be forgotten.

Among the deciduous trees there are different varieties of maple that are fast growers, and are valuable for timber as well as for shade. The

linden, or basswood, with its large and beautiful foliage, is worthy of a place in our lawns and yards. The elm, with its lofty trunk and spreading branches, can not be surpassed for street purposes, and is very highly esteemed for general use. There are many other varieties we might mention of the shade and ornamenal trees, but we fear that we have already intruded on your time.

Respectfully submitted,

L. WOODARD.

Marengo, McHenry Co., Ill., Dec. 1870.

The report was received and ordered printed.

Mr. Edwards, Vice-President of the Second District, not being present, the report of Mr. A. C. Hammond, Vice-President of the Third District, was called for and read, as follows:

REPORT OF THE THIRD HORTICULTURAL DISTRICT.

Mr. President and Gentlemen of the State Horticultural Society:

As Vice-President of your Society for the Third District, I submit the following report:

In order to obtain the necessary facts for making a full report, I addressed a letter of inquiry to some one in each of the twenty-one counties in my district, asking for information relative to the condition and progress of Horticulture. The result of this correspondence has been but five favorable replies. Some plead want of time and ability; others complain that they have responded to similar applications before, but this Society has failed to give them the proper credit, and their communications have been seemingly ignored; while others have altogether neglected to reply.

I will here suggest the propriety of carefully revising the Committee of Correspondence published in our annual volume, as there can undoubtedly be one man named in each county who will be willing to assist the Vice-President in making his annual report.

From Mercer County, ex-President McWhorter writes: "The continued drouth of early spring, extending into mid-summer, was exceedingly disastrous to planters, and Pomona has been very unpropitious in her blessings. No cherries, no currants to speak of, and only a scanty allowance of berries of any kind. Grapes alone have produced a good crop. Orchards bloomed sparsely, and the amount of fruit retained was greatly diminished by the drouth. Summer apples produced better than winter varieties, though the latter attained better size, owing to favorable rains later in the season. The striking difference between the past season and that preceding it, affords opportunity for interesting observation. The past summer was nearly rainless from March until the middle of July, and our apples are nearly free from scab. Such varieties as are usually worst infected, as White Winter Pearmain and Ortley, are remarkably fair. The year previous ('69) we had almost

continual rain, and apples were exceedingly scabby. It can not be disguised that there is less buoyancy in horticultural and fruit-growing interest than formerly. We have hitherto directed our energies mainly with reference to dollars and cents. If we expect to keep up a living interest, we must turn our attention more to higher culture in rural taste and homestead decoration."

D. B. Wier, of Marshall County, writes as follows: "We had no rain here from early in May until the 7th of August to amount to anything—the hottest summer ever known by the oldest inhabitant. These two combined resulted in cutting our crop of strawberries, raspberries, and blackberries very short indeed. Still where they were well cared for by thorough cultivation early in the season, they gave a fair return; and, owing to scarcity, high prices were obtained, and average returns were received for the partial crop.

"The past season shows that we should not put our dependence on too few varieties of any fruit. Some of the most noted of them failed this season, while others not generally recommended proved productive and profitable. Thus the Wilson strawberry was an entire failure in this neighborhood, while McAvoy's Extra Red, Early Scarlet, Iowa, Jenny Lind, Fillmore, &c., were quite productive. The black raspberries did not stand the intense heat so well as the yellow and red. Gooseberries, currants, and cherries produced very light crops. The grape crop, when the vines had good treatment, was very large and the fruit very fine. All varieties did well. But on heavy soils the wood did not ripen well, owing to excessive wet since the rains began. Here, along the banks of the Illinois, we can still grow the Catawaba and Isabella, with perhaps as good success as they were ever grown anywhere; and we find that if we understand their wants and supply them, they are the most profitable varieties to grow for the main crop. The Concord is perfect, and can be grown in unlimited quantities, but its season is too short. All varieties do well here, except Iona, Israella, Adirondac, Allen's Hybrid, and a few varieties of less note; and it may be the failure of these so far has been owing to worthless plants in the start.

"Pears.—Though the crop was light, the fruit, as a rule, was very fine as to size and quality, though some varieties that are usually very fine were this year quite astringent, the trees remaining in perfect health throughout the season.

"Our Apple crop has been immense, but generally poor in quality, though those orchards that were thoroughly cultivated and little troubled with insects gave the finest fruit I have ever seen. Nearly all our early and mid-winter apples were ripe at or before gathering time, which resulted in great loss. But some of the late growing and keeping varieties, such as Rawles, Jannet, Willow, Limber Twig, and a part of the Ben Davis, show promise of keeping their allotted time. Where orchards were in grass, and especially where pastured, the fruit all fell off and the trees have suffered severely."

B. L. T. Bourland, of Peoria County, reports: "It is not apparent that the county is making much progress in Horticulture. Our vine-

yards are being extended every year, and the supply of excellent grapes in the market is constantly increasing, the price being fully sustained by the increased consumption.

"Small Fruits of the different varieties, as strawberries, raspberries, blackberries, currants, and gooseberries, show a marked improvement, in both quantity and quality. The culture of pears is decreasing, on account of the ravages of the fire-blight, for which no remedy or mitigation has been found. So with plums; with a soil and climate suited to the growth of this beautiful and delicious fruit, the best efforts of the most intelligent and industrious growers are rendered utterly futile by the presence of that abominable "little Turk," the curculio. The supply of apples is abundant, but no improvement noted in the management of orchards. In *peaches* we once claimed a pre-eminence in this section of country. I have seen them so plentiful in this market, that they went begging at sixty cents a bushel for pretty fair fruit; and I have seen large, luscious fruit allowed to rot on the ground, or to be eaten by the hogs, because of the abundance. But the winters of 1855-6 and of 1858-9 did the business for the peaches, killing not only the fruit buds, but the trees, root and branch. Since then we have bought peaches by the box from "Egypt" and Michigan. Our insect and climatic enemies, so called, are doubtless friends in disguise, for if we were free from them, we would be even as California, where the finest fruit, such as pears and peaches, is consumed by the hogs, or rots upon the ground. Hence in California the fruit grower can make nothing; here he can make a good living from the product of a few acres."

John G. Zeller, of Woodford County, contributes the following interesting report: "Horticulture in our county is fairly progressing. The last six or seven years, hundreds and thousands of fruit trees and vines have been planted, and a good share of them well taken care of. Apple trees have naturally been most largely planted, but pears and the fine varieties of cherries and plums have not been neglected. Many varieties of grapes have been planted with varied success; but at last the public mind has settled on the Concord, not as the best, but the surest, and consequently the most remunerative variety. The timber portion of our county is the most favorable for fruit culture, both on account of soil and protection. On dry clay soils we find our healthiest and best orchards, and the fruit is superior to that grown on sandy bottoms, or prairie soil. It was once thought that on genuine prairie soil fruit culture could never be carried on successfully; but experience, gained from a number of earnest experiments, has convinced every one to the contrary. We have now in the midst of our prairies, far away from timber belts, some promising young orchards. The subsoil on nearly all our prairies is a stiff impervious clay, and to make trees thrive well, it is necessary to provide good surface, or underdrainage, and to subsoil where the future orchard is to be planted. A belt of forest trees on the north and west, and, I might add, on the south side, would be a great advantage. Many wide-awake prairie farmers have already protected their young orchards by timber belts. Much has been done lately on our prairies in

the way of hedge planting and arboriculture. With the exception of a few evergreens for ornamental planting, the Osage orange is the principal hedge plant used. It is largely planted in our whole prairie region. Many good hedges are seen, and many more that are an eye-sore to the passer-by. We have had an average crop of fruit this season. Plums were almost an entire failure, owing to curculio and excessive heat. Insects have also damaged the apple crop, at least two thirds of the fruit being stung; but what remained was of superior quality. Grapes yielded well and made good wine. Even Catawaba forgot its sensitive nature and matured a crop of superior fruit. Peaches brought a good crop. Pears produced well, and brought fine fruit. In blooming time, my pear trees were attacked by the cucumber beetle, and before I found a proper remedy, they destroyed nearly all the blossoms. I tried lime, sulphur, and whale oil soap, without any effect; but finally used a solution of carbolic acid, which had the desired effect. On our pear trees the bark on the trunk frequently dies some two or three feet from the ground, and always on the south side. It would seem that this is caused by the rays of the sun in cold weather. At any rate, I find that wrapping the trunks with old cloth has so far prevented it."

I am indebted to J. Cochrane, Esq., for the following interesting sketch of ornamental and timber trees of Mason County:

Ornamental and Timber Trees in Mason County.

Gentlemen: Having in a former note given a history of some of the early efforts at fruit growing in Mason county, as well as its present progress, I herein send you a brief outlook at the *Ornamental and Timber Trees*, which I regard of vital importance in our prairie country.

The eastern and northeastern portions of the county are almost destitute, fuel being supplied by coal on the Chicago & St. Louis Railroad, while the west and the south-west are more generally supplied by the Illinois river timber, and the bluffs of coal in Fulton county. Timber and lumber for building purposes are imported from the northern pineries, amounting to many millions of feet per annum.

While fruit trees and grapes have been planted by thousands, (about 100,000 of the latter in 1869) the planting of ornamental and timber trees has not engaged the attention of land owners. No more profitable investment could be made than growing those trees which are noted for rapidity of growth or durability; such as the American chestnut, box elder, black walnut, white elm, and others which will be noted.

The writer within the past fifteen years, has given the subject sufficient attention to state from experience the varieties adapted to our soil; those that have been introduced, and those to the "manor born;" though in detailing my experience, the personal pronoun will be as much as much as possible ignored. The following trees growing here native, are more noticed for variety than quantity, viz.: soft or silver maple, box elder, white birch, buckeye, hickory, (three varieties) pecan, ash, (three varieties,) honey locust, Kentucky coffee-tree, black walnut, wild cherry, sycamore, American aspen, cottonwood, oak, (comprising white oak,

mossy-cup oak, post oak, water oak, black-jack oak, red oak, and pin oak,) locust, (three varieties,) willow, (three varieties,) American linden, white and slippery elm, alder, paw-paw, hornbeam, red-bud, hackberry, red and white dogwood, persimmon, (several sorts,) burning-bush or strawberry tree, mulberry, hop tree, crab apple, sassafras, spice bush, prickly ash, sumach, and others I may not have observed. Those named below have been successfully cultivated by the writer, and show that you need not wait till gray hairs to reap the reward of your labors, and those labors a pleasure.

Silver Maple, cultivated from seed, and from forest seedlings with success.

Sugar Maple, of slower growth than the above, but preferable.

Box Elder, an extraordinary rapid grower. A first-class shade tree.

Buckeye, a native of great beauty; early in leaf; a well-rounded, close, compact grower. I have seen in the grounds of Gen. Orr, in Northern Indiana, some fine specimens, which fixed the status of the Buckeye, as an ornamental tree, in my estimation.

Birch, in some of its varieties, has been a hobby with that species of the genus homo, yclept tree peddler, in this county. They have proved as worthless as the scamps who vend them, either for use or ornament.

American Chestnut. I can but regard this variety as a valuable acquisition to Western planters, for timber, ornament, or fruit. Of the easiest cultivation; a rapid grower; bears at about five years, from the seed. Trees of that age bore for me last year, which are the first nuts ever grown in Mason county.

Hickory, as before stated, grows here in several varieties, valuable for timber and ornament.

Pecan resembles it so nearly, its wood can be used for the same general purposes.

Beech would also be a desirable acquisition, but I have not yet undertaken its cultivation.

Ash I have grown from seed; a handsome shade tree that merits more attention.

Black Walnut, a prince of trees: grows spontaneously; is a valuable timber tree. I have walnuts twelve feet high, three years from the seed; am growing them yearly with the chestnut, and planting the young trees in different localities on my farm; around the peach orchard and nursery, along the road, and on the outer line fences, etc,; picketing vineyard, garden, and field; genial alike for their shade, beauty, and fruit; and in after years, when they need thinning, their timber will be valuable for posts, rails, and lumber; and even the knots and forks command a high price for veneering.

Larch, European and American, have been grown, but not to the same extent as the walnut and chestnut. Two classes of our waste lands (viz. high sandy, and low marshy) could be profitably employed by planting in this timber, the variety adapted to each. Both would be very remunerative, and yield quick returns.

Lombardy Poplar and its cousin, Balm of Gilead, are grown with ease and success.

Locust, planted by the first settlers, was a doubtful favor to the country.

Willow hedge has been introduced to a limited extent. It will remain limited.

Cypress. A few are grown satisfactorily.

Linden does well, both European and American.

Elm, a success everywhere. It has a host of virtues and no faults.

Barberry, valuable for fruit, ornament, and hedge. Hardy from Labrador to Guatemala.

Catalpa, a rapid grower and hardy, but its near relative the *Pawlonia* I have tried to grow for ten years. It will grow twelve to sixteen feet in a summer, and freeze to the ground every winter.

English Hawthorn, a thing of beauty, hardy and good.

Persimmon does finely, producing three distinct grades of fruit. Can they be improved?

Strawberry Tree, plenty in the woods.

Osage Orange is here at home. Our soil seems peculiarly fitted for its perfection.

Wild Crab Apple I grow for its flowers.

Mountain Ash is not a "perfect success," being subject to nearly the same diseases that so sorely afflict our apple trees.

Sassafras grows only to a very limited extent; prefers a clay to our sandy soil.

More might be added, but the above has swelled this paper beyond its intended length, but I can not close without noting a curiosity in nature's arboriculture. Near the center of this county, on the center of a prairie many miles in extent, in some directions beyond the reach of unassisted vision, rises a natural elevation of about forty feet, circular in shape, cup-shaped on top, and covered by a very remarkable mixture of trees and shrubs; everything in fact that grows in the county, and some that are found nowhere else, here find a home. In this natural collection of sample varieties I have spent hours in finding here a hackberry, an elm, a paw-paw, prickly ash, black walnut, maple, etc., etc., in a perfectly promiscuous maze. My own theory is that the seeds of these numerous varieties were carried thither by the birds who sought this mound as a resting place and for water (which it supplies), in their flights from and to the distant belts of timber.

The importance of timber cultivation can not be over-estimated, and as a citizen of the Garden State of the great West, itself a garden (though of somewhat extended dimensions), I hope the State Horticultural Society will use its influence to secure such legislation as will encourage or compel the planting and subsequent care of ornamental and timber trees. Every consideration of interest, health, patriotism, pride, and æsthetic taste, urges to this end, with no one reason against it.

Respectfully,

J. COCHRANE.

In Hancock County the apple crop has been a very fair one. In some orchards, particularly in the timber, the fruit was so badly punctured by the codling moth that it all dropped in August and September, while from others a good crop was gathered. Those orchards in which the fallen fruit was eaten by stock last season appear to be the most exempt. We find, however, that we can not depend on the hogs and sheep to keep them in check, as a great portion of the second brood escapes from the fruit before it drops from the tree. I find they can easily be trapped by placing a cloth band around the tree. It should be removed as often as once in two weeks, and the larvæ killed by scalding, or some other process, and then replaced. With the exception of a few such varieties as Winesap, Willow, and Little Romanite, our winter apples all ripened prematurely, being in about the condition in November they should be in March. The result has been that growers and dealers have suffered great loss."

Our peach crop was good, but the early varieties werebadly injured by the curculio.

There are several choice seedlings grown in the vicinity of Warsaw fully equal to any of the budded varieties in quality, and much more productive. They are being extensively planted.

Pears were about an average crop, and brought remunerative prices. The blight is yearly making sad havoc with our pear orchards, and faint-hearted growers are becoming discouraged; but the man who persistently plants and intelligently cultivates, and root-prunes will not fail of his reward.

Our grape crop was the largest and best ever grown in the county. The Catawba, after several years bad behavior, is again taking the lead. It has been perfectly free from disease, held its leaves well, and ripened its enormous crop of fruit evenly. Mr. George B. Worthen, of Golden Bluff Vineyard, gathered from his Catawba vines about three and a half tons per acre, his Norton's Virginia producing three tons, and Concord two and a half. This may be considered a fair representation of the productiveness of these varieties. The must of all varieties was found to be remarkably heavy, and a wine of superior quality must be the result. We are confident that the vintage of 1870, from the hundred vineyards that crown the river bluffs from Nauvoo to Warsaw, will be of such a character as will place Hancock County in the front rank, as a wine growing locality. Vast quantities of grapes have been shipped to distant markets, principally Chicago and St. Louis, but the middle men have generally received the lion's share of the profits. Our grape growers are, however, greatly encouraged, and are satisfied that the business will be a success. The general outlook may also be said to be encouraging, as all our fruits have been reasonably remunerative, and our trees and vines are in good condition for next year's crop.

We find a very marked improvement in ornamental planting and out-door home adornment. Many of our farmers are brushing up their farms, removing the hog pens and stock yards from the front to the rear of the house, planting hedges, groves, and belts of timber, ornamenting

their grounds with evergreens, and even spending an occasional hour in the flower garden, assisting their wives and daughters in its preparation and arrangement. If we expect to keep up an interest in Horticulture, we must turn our attention more to this its most delightful branch, and endeavor, by precept and example, to create and encourage a taste for home embellishment. Outside the list of amateur and professional horticulturists, very little of this work has yet been done. But if we, as a society and individuals, perseveringly pursue our legitimate work, many of us who are here assembled to-day may live to see this, our noble prairie State, the fairest spot the sun beholds in his daily course from sea to sea, what it is capable of becoming—*the garden of the world.*

All of which is respectfully submitted.

A. C. HAMMOND.

Mr. Hammond's report was received and ordered to be printed.

The President stated that all reports of regular committees would take this course, unless some member objected.

E. Daggy presented the report of Tyra Montgomery, Vice-President of the Fourth District, which, upon request, he read:

REPORT OF THE FOURTH HORTICULTURAL DISTRICT.

Mr. President and Gentlemen of the Illinois State Horticultural Society:

In accordance with the duties incumbent on me as one of your vice-presidents, I herewith submit some of my observations, also those of others who have kindly furnished me with the same.

The past season has been a remarkable one, free from those deluging rains that often fall in April and May. We have suffered very little from the drouth, and, so far as agriculture is concerned, everything has gone lovely. In the tree planting interest there has been greater loss than, perhaps, for years, owing chiefly, no doubt, to the October freeze of '69; and this has not been confined to trees transplanted from nursery row to orchards, but many orchards suffered severely, and some varieties in particular, such as Rambo, Maiden's Blush, Golden Russet, Roman Stem, Rome Beauty, etc. E. Daggy says, in his locality, (Tuscola, Douglas County,) "the worst feature was the destruction of hundreds and thousands of fruit trees by the freezing in October '69. In our apple orchard, just beginning to bear, we lost about one sixth, that had to be taken out, and probably as many more considerably damaged that will go into early decay. Other orchards suffered also. Of cherries, we lost quite a number; even the Early May, and that on Morello stocks. A neighboring orchard on Morello got through safely, and produced about one thirdof a crop. The Heart and Duke cherries were generally killed. I am fully satisfied that this class of cherries is only a source of vexation and disappointment."

In many other places the same results have followed, but we are consoled with the idea that such another snap may not again occur for years to come.

In the Grand Prairie we have much grounds for encouragement upon the subject of "fruit raising," when even in Egypt we hear of failures; and while we have not been allowed to enter the ring by frowns from our timber friends, we, this year, have great reason to be thankful and to take courage—it may yet turn out we are in the "fruit growing region."

T. L. Bacon, of Pana, Christian County, says: "An abundance of small fruits; apples plenty and mostly very good; some complaint that they are not keeping as well as usual. I think it is owing to their being gathered too soon for the warm weather we have had. Peaches very plenty and fine, except the earliest varieties—they were full of worms. Cherries not very plenty. Pears plenty and fine; we had fine specimens on dwarf trees planted in the spring of 1869."

H. J. Dunlap, of Champaign, says: "Strawberries, blackberries, grapes, and apples were a full crop and paid well; while currants, gooseberries, and cherries were a failure. Season dry. No new insects this year."

In this vicinity (Mattoon), we have had an abundant crop of small fruits, and an increased interest is being manifested in their planting and culture. James Riddle gave the following as his observations: "Strawberry crop good—none equal to Wilson's Albany. Raspberries very fine; Doolittle for market, Purple Cane for home market and family use, yield well. Much pleased with the Miami, or Cluster, and the Davison Thornless. Raised splendid berries, and shall increase his planting of that variety. Lawtons full and very fine. Kittatinny full and fine, and ripe when they *appear* so, while Lawtons are not."

We raised a fair crop of currants. The borers are on the increase. Gooseberries, in sheltered places, were full. Pears destroyed by snow storm mixed with hail when in bloom, except in sheltered places. Orchards should have hedges or timber belts about them, and nothing surer, we will then succeed. Apple crop only moderate. Codling moth busy, and brought all the crop into market early. The Northern Spy bore well this year, and the trees were rather young, an exception to the rule. Peaches plenty, but rather under size, except on young trees. People have not *all yet learned that there is such a thing as a peach-tree borer*, and the borers thereby improve their opportunity to bore.

The more light and knowledge, the larger and finer fruits; you must have healthy trees before fine fruits. One remarkable case of pear blight —trees grew in vegetable garden, have borne full crops for the last five years. This year the grounds were not cultivated and the trees almost all blighted to the ground, apparently dying of *neglect*. Rather against this idea of *going to grass*.

M. C. McLain, of Charleston, Coles County, says: "In the blooming season all kinds of fruit trees (peaches excepted) gave great promise of an abundant yield of fruit, but in all instances except that of the May cherry, we were doomed to disappointment, and especially is this true of the *timber regions* (where apples particularly have hitherto been considered a sure crop). Both the apple and pear set an abundance of fruit,

which commenced dropping when it attained the size of a hazel-nut and continued to drop, up to maturity, leaving but few, in fact scarcely a specimen, of really sound fruit on either apple or pear; and yet the trees, to all appearance, made vigorous, healthy growth. The codling moth took the apples, and the curculio the pear. Out in the prairie regions I saw some orchards loaded with fair looking fruit, but have recently learned, from different quarters, that the very best specimens of apples are not keeping well. We had comparatively few budded peaches, and the seedlings were full of worms. My May cherries were all right, and that may seem strange to some when I admit they are budded on the *Mazzard*. May Dukes were more or less injured by curculio. Currants, gooseberries, raspberries (black cap), and Lawton blackberries bore full crops. Strawberries from fair to full. Wilson's Early blackberry set a fine lot of fruit, the plants not being mulched, and when dry weather set in the fruit was about matured; all went by the board. Kittatinny did some better, but not equal to the Lawton, taking it all in all. I can't say that with all the fruit enemies to contend with, I consider the fruit prospects very flattering in this part of the State."

As to grapes, none of the above writers have reported. The Concord, Hartford, and Clinton did well; the Catawbas and Isabellas rotted as usual—need not be depended on. The Concord should be planted everywhere and by every farmer. Can raise grapes plenty and as easily as hops; but the people are confounded by the "Books on Grapes," and fancy a man must stand over the vines with knife and pinchers, and hence "they do not have time to raise grapes."

As to plums I have not heard of one perfect one in all the district. Mr. Payne, of Pana, has usually had splendid luck with plums grafted on common wild plum stocks, but the curculios have found him at it and gone in, in spite of *old horse shoes and rusty iron*, which by many have been held forth as preventives; but a brighter day is dawning. We have seen a picture of the Curculio Catcher, and there has been a "Wild Goose" man about here with a dead sure thing on these curculios, and it may be that our Entomologist will have to get out a new cut for the Turks with bent or broken snouts, when these high priced trees begin to bear.

A word about birds and bugs and I close. The former have been on the increase, and as we increase our orchards, groves, and timber belts, they will be on hand with their songs. In our locality we have not as yet gone to war on the birds. On the question of birds, I would enforce the statute against every loafer who would shoot, for mere amusement, any of the feathered tribe. The robin, in cherry time, is not a thief, but he helps himself freely in open daylight—rather too much so when cherries sell at fifty cents a gallon. And for my part I should prefer that they would arrange their broods a little later in the season; yet they are patterns of energy and industry which men would do well to imitate; and the planting of a few extra trees might be well, as the demand increases and the tastes are cultivated.

Bugs were rather a short crop for so good a season. The potato bugs, I am glad to say, were doomed to disappointment, as we failed to raise

a sufficient crop of potatoes to make it an object to the bugs to hunt for them—market glutted the year before.

In conclusion, I would urge the planting of orchards, hedges, screens, and timber belts, any and all kinds of trees on the prairies (except locust). Close cultivation, clean corners; kill the noxious insects by fire, water, *wine* (Schrœder's), or any other means. Be of good cheer. Eternal vigilance is the price of *fruit*, as well as "liberty."

Yours,

TYRA MONTGOMERY,
Vice-President 4th District.

M. L. DUNLAP moved that the fee for membership of this Society be reduced to one dollar per annum, which was seconded by several members.

He urged that it was the province of the Society to *disseminate* horticultural information as well as to gather it. That inasmuch as the State appropriates the sum of two thousand dollars per annum for the publication of our reports, and for other purposes, we should not restrict the circulation of these reports by keeping the fee at two dollars, and so far defeat the object of our organization and the design of the General Assembly in granting the appropriation.

When the membership fee has been but one dollar, we have had more members than when it was two dollars. As each member is entitled to a copy of the Transactions, of course a greater circulation is gained at one dollar. We should aim to distribute all, or nearly all, our books, and not keep them on hand from year to year.

Mr. HUGGINS, Treasurer, said: "We receive more money when memberships are two dollars each, but not as many members."

The SECRETARY stated that he had solicited from the State Agricultural Society two hundred copies of its last volume of Transactions, for gratuitous distribution among the members of this Society. These books have arrived, and are now ready, so that each member of our Society will receive not not only a bound copy of our Transactions for 1870, but a copy of the Transactions of the Agricultural Society for two years, which includes, also, the Transactions of our own Society for the years 1867 and 1868. With these inducements before them, he thought all who would join our Society at all, would do so with the fee at two dollars; and thus bring twice as much money into the treasury as if changed to one dollar. This, in the present low state of our finances, is a matter of serious importance to us.

Mr. BROWN, read from the Transactions of the Society, as follows:

In 1865	there were	80	members	at $2.00	$160.00.
" 1866	"	128	"	1.00	128.00.
" 1867	"	125	"	2.00	250.00.
" 1868	"	161	"	1.00	161.00.
" 1869	"	133	"	2.00	266.00.

SECRETARY.—In answer to letters of inquiry for copies of our Transactions, I have replied that paper-covered ones could be procured at one dollar each, and I have accordingly sold a few in this way. I think this was the practice of the former Secretary.

M. L. DUNLAP said that his object was to place these Transactions in the hands of the people, and if they can be obtained at one dollar, this fact would modify his opposition to the present rate. Yet he thought it not equal that members should pay two dollars, when others could procure the books at one dollar each.

The SECRETARY explained that the members had bound copies sent them, while those sold at one dollar were in paper covers. Pending the vote, Mr. Earle moved that, as the hour of adjournment had arrived, the Society do now adjourn. This motion prevailed and the President announced an adjournment until two o'clock.

TUESDAY AFTERNOON.

Society met pursuant to adjournment.

The report of the State Horticulturist being in order, the Secretary read a telegram which he had just received from Messrs. Riley, Tice, and Spalding, dated at Peoria, asking that Dr. Hull's report be postponed, as they were detained on account of failure to make connections with the train to Galesburg.

Their request was granted, on motion of Mr. Murtfeldt.

Owing to the absence of Mr. Wier, the report of Committee *ad-interim* on Grapes was also postponed.

Mr. Douglass' paper upon Evergreens came next in order, but he was, at his request, allowed further time to complete it.

The motion of Mr. Dunlap, which was pending when the adjournment at noon took place, was called up.

Mr. EARLE favored the motion, saying that he had been informed that we had a large number of copies of our Transactions of previous years, on hand. Our books are intended for circulation, and we should use all proper means to secure their just distribution among those who desire them, and will be benefited by them. He thought the reduction of price of membership to one dollar would result in calling in a large membership, especially if the fact could be made public through the agricultural press.

The PRESIDENT stated that the demands against the Society will nearly exhaust its funds; and that of the one thousand copies of Transactions of 1867 but few were remaining. Being asked to whom the seven hundred paper-covered copies were given or sold, he replied that one hundred to one hundred and fifty were taken by members; about two hundred went to committees, and persons furnishing contributions to the volume; to the State Agricultural Society about fifty copies; the remainder to local societies, kindred societies, and members of the press. Of the volume of 1868 he said there were about two hundred copies on hand.

M. L. DUNLAP said that he not only would advocate the reduction of the membership fee to one dollar, but would have the price of copies of our Transactions fixed at one dollar also.

This, he thought, would carry out the intention of the General Assembly in granting us the appropriation, and would place our books in the hands of those who would be most benefited by them.

The vote being taken upon the motion resulted in a two-thirds majority in its favor, and the President declared the constitution amended, accordingly.

M. L. DUNLAP now moved that the Secretary be instructed, at his discretion, to procure the binding, in muslin, of the entire edition of the Transactions of this year; either diminishing the number below one thousand sufficiently to meet the extra expense, or paying the difference and procuring the full one thousand copies.

Mr. GALUSHA stated that in the present state of the finances of the Society he feared his inability to meet any extra expense for binding. He had contracted for the binding in muslin of five hundred copies, instead of three hundred, as in former years. He would prefer to have nearly or quite the entire one thousand bound in muslin if we have the funds to meet the expense. He would not like to change the terms of his contract with the printers, but could procure the binding of additional copies if the means are at hand.

Mr. DUNLAP said he was willing to leave it in the hands of the Secretary.

The motion was so amended that the Secretary be instructed to secure the binding in muslin of the entire edition, or as large a number thereof as in his discretion the funds of the Society will warrant. The motion, as amended, prevailed.

The President called upon Mr. Wier, who had arrived, for his report, *ad-interim*, on grapes.

He responded, presenting his report, and asking Mr. Earle to read it.

Mr. Earle then read as follows:

D. B. WIER'S REPORT, *AD-INTERIM*—GRAPES.

To the Hon. O. B. Galusha, Secretary of the Illinois State Horticultural Society:

DEAR SIR:—As a member of the *Ad-Interim Committee*, I offer you my report on Grapes. At the first business meeting of our committee, it was resolved, that the better plan was to appoint to each member a specialty to look after, during the season, at home and on our travels. My allotment was grapes, firstly, and small fruits, secondly. It was also agreed, that we should get up no grand special train excursions, heralded by the press, to visit places where everything was especially prepared to receive us. So we made but two formal visits throughout the season, but dropped quietly around amongst our horticultural brethren, and viewed their doings in their every-day clothes. In this way we did not get so many "chicken fixins" for dinner as the old plan

produced, but we got practical and valuable information, as to how, and by whom our orchards and vineyards were dressed, and how they looked. We also agreed not to individualize; that is, we thought it of no great importance for our Society and the public to know just how many trees and vines Mr. A. and Mr. B. cultivated, or how many grape cuttings Mr. C. had out, or how many acres Mr. D. had in apple nursery or evergreens, or where we partook of the best dinner, etc.

Now, as to the grapes, and how they appeared to me in the year of our Lord 1870, I hardly know how to commence, or what to say. If I had been called upon eight years ago for an essay on grapes, I would have thought the task a very pleasant one to fill, and would have been only too glad of a chance to enlighten (?) the world on this, then the all-absorbing question in Horticulture.

I did hope in my report to give some valuable advice concerning the commercial value of different varieties; but the season has been so exactly suited to the health of vine and fruit, that comparisons would not be just. Last year was, I think, a season especially adapted to this work. I had thought to compare different modes of training and pruning the vine; but when one finds every system perfect in its results, how is a comparison to be made? I have seen, this season, vines gathered roughly together and tied to a stake, giving equal results with those under the most elaborate systems of pruning and training. Now, with these facts before me, what is my duty? You did not appoint me to tell you what I thought was the best, but, if I understand my position aright, it was to compare different systems in the field, and report to you which one of the numerous modes of vineyard culture gave the best results; give the details of that system, so that any one might adopt it, with the assurance that he was not going astray. Farther, as to soils: I have, this season, seen large plantations of grapes on nearly every imaginable soil, all well nigh perfect; very little choice to be made amongst them. I might guess that certain parties had made a poor selection of soil and exposure on which to plant; but the results this season would show me to be a poor guesser. A close watch kept of the Chicago and other great markets warned me not to attempt to delude more people with the idea that they could speedily get rich by growing grapes for market. Farther, I found plenty of men who had good wine; wine that they were proud of, and with good reason; but when questioned as to where their market was, the almost invariable reply was, they had not found it yet. People would, it appears, rather pay four dollars a gallon for a vile concoction of logwood, cider (perhaps a still cheaper acidulate), and poor whisky, than to pay two dollars a gallon for a pure, healthful, native wine. Still another skeleton is in our closet, to-wit: If they can grow grapes in California, and deliver them at the press, with profit, at one cent per pound, or less, how are we to compete with them? I do not believe that we can produce grapes for less than four cents per pound net.

These are only a few of the stumbling blocks in the way of profitable grape culture in the Prairie State. But your committee passed in its

wanderings thousands and tens of thousands of the homes of our Illinois people who had not one vine of this easiest-grown and most healthful fruit growing on their premises. To these benighted creatures, we should give our most earnest attention and entreaties. It is our first duty to show them their sinful way; to prove to them that a man is not in this day and age of the world entitled to his own self-respect, still less to that of his neighbors, if he has not a plentiful supply of grapes of his own growing, in their season. At the prices that good vines of good varieties are now being offered, there is no excuse but that all, even the poorest land-holder, should have plenty. Why, the price of a glass of lager beer will buy two, and that of a cigar four good Concord vines! The vines for an acre can be bought for $15! and this season has proven to us that, with proper management, any land, from the mucky swamp to the gravel bank, can be made to produce an abundance of good grapes at one-tenth the outlay that we were formerly taught was requisite.

VARIETIES.

The man who attempts to classify and describe all the native grapes before the public ten years from to-day will have undertaken a task of vast magnitude. From present appearances, certainly, if we keep on in this line of producing new varieties, as we are now doing, and if he commenced with the Catawba, at the end of ten years, he would still be ten years behind. But let the good work go on. We now have plenty of varieties, but not enough that are exactly the right thing; and with all the seedlings now being produced, it may be years before we have another as near perfect as the Concord. The old *Vitis vinifera* of Europe, has been skillfully manipulated by man for thousands of years; yet scarcely a season passes but what new varieties are brought out with marked improvements over the older kinds. I have been lately somewhat astonished to learn that some of our most renowned and experienced horticulturists are beginning to have faith that the *Vitis vinifera* of Europe and Asia, will yet produce varieties that will withstand our climate, diseases, and insects. They have no doubt whatever but that hybrids between it and our native species will be and are already produced that will fill our wants.

In speaking of varieties this season, it is, I think, only fair to leave out of consideration the damage done to vines by the October freeze of last year—an accident that may not happen again in an age. I shall not give so great prominence to the diseases, such as mildew, rot, etc., nor to the insects infesting the vine, as has been done heretofore, to the disparagement of certain varieties, otherwise first-rate. I shall look upon these troubles as being easily overcome by the use of well-known, simple remedies, being well convinced that we have got to overcome these troubles, not by raising and puffing new varieties, but rather by constant care and warfare, and the persistent use of remedial agents. We find no living thing on earth free from diseases and parasites; why should we look for an exception in the grape? Of course I do not pretend to say

but that there are varieties of grapes that bear good fruit that are so liable to become diseased that they should be discarded. My notes are made up from personal examination of the growing vines in different portions of the State, and from reliable data, gleaned from the horticultural press.

Hartford Prolific.—This variety heads the list for health and productiveness, wherever seen or heard from. We need something at the same season, with all of its good qualities, but very much better in quality; but it is not yet, I think, superseded.

Ives' Seedling.—This variety equaled the last in health and vigor, and nearly equaled it in productiveness. A very valuable grape, ripens early, hangs long on the vine, and is very productive of a good, rich, red wine; succeds almost everywhere in our State; rather poor in quality for table or market.

Concord.—The only fault I have to find with this noble grape is its reported *parentship* of the *Martha*, which, I hope, is a slander. This is the people's grape, emphatically. They can raise it everywhere. (Some *raise* it as Mark Twain raised chickens.) They like the fruit, and it is yet considered the nearest approach to perfection we have among grapes. Give us two more Concords, one three weeks earlier and one three later, and we would be pretty well "fixed." There has been a great howl raised this fall about its cracking a little when over-ripe. I have not known such a thing to happen before, and it was simply occasioned by the intense heat and drouth hardening the skin of the fruit; and then when the rains did come, the Concord thought it had a destiny to fulfill, or burst. It bursted. As I have before remarked, when good Concord vines can be bought for $25 per thousand, there is no excuse for any one owning a rod of ground not having plenty of Concord grapes in their season. About its only fault is that it will not keep. When just red, it is most excellent for cooking. Stewed with plenty of sugar, what fruit is better? Canned, we can have it the year around. As a fruit for jellies, it is unsurpassed. It makes an excellent white or red, light wine, without any admixture, which should be on our tables every summer's day. This wine can be made as cheaply, or cheaper than cider, gallon for gallon and acre for acre; and makes a vinegar by far surpassing any other I have seen, by adding water to the refuse of the press and allowing it to ferment, re-pressing and setting it in a warm place. The Concord grape has its diseases already, and we may look for more; but its sturdy vigor, hardihood, and adaptability to nearly all soils and climates, will cause it to hold its present high niche in public estimation for years to come.

Clinton.—The market gardeners do not want it. The wine grower, especially in the north part of our State, should plant largely of it on proper soil. Every family should grow plenty for family supply. To the great mass of our Western grown people, the Clinton, when fully ripe, is one of the very best to eat from the vine. If we would only let it get ripe, we would all prize it highly. It keeps well into the winter; the fruit will hang on the vine, improving every day, until severe freezing

weather. It is the very best grape we have for a medicinal wine, and for my taste, when properly diluted, the best and most refreshing wine for the table. The vine requires a thin, dry, porous, warm soil to give its best results, and needs plenty of room, long pruning, and little of it.

I have now named the four great grapes of our State that are to be relied on everywhere, or, at least, where it is possible to grow grapes at all. The following succeed admirably in special localities, and some of them in such places should supersede the above-named sorts.

Catawba.—Everywhere in the so-called "River District" of our State, on our drift sands, and light, silicious clays, where properly managed, the old Catawba is still the best and most profitable grape to grow, both for the wine-grower and market-gardener. I wish to be distinctly understood as saying and meaning the above, only where the soil is *right*, and its requirements are complied with. Perhaps ninety-nine men out of a hundred would fail with it on the best soil, but I do know, of my own personal knowledge, of men who have cultivated it for twenty years with perfect success, and who would not give it for all other varieties in existence. You can not learn to grow the Catawba from the books. I might be able to give you the proper outlines for success, but you would better take good advice, and not attempt to grow it.

Isabella.—The best market grape we have as yet, all things considered, where it can be grown successfully. These places are unfortunately few. It requires the same kind of soil, though a little richer, as the Catawba, plenty of room, and peculiar treatment.

Delaware.—We found no fruit to speak of on this variety, on high prairie soil, this season, but at some points it was very fine. A most delicious and beautiful little grape when in perfection, but very capricious. Those few among us who have planted it, and with whom it has done well, will stick to it and plant more of it; but those who have failed, would best let it alone, for I do not believe it is within the art and power of man to make a Delaware vine grow where it don't want to.

Norton's Virginia—Still holds its place as the best grape for red wine in the middle and southern portions of the State. We of the north have no use for it.

Rodgers' Hybrids.—These grapes appear to be much better in point of quality west than east. Some few of them would prove of great value in certain hands and in proper soils. Mildew is their great bane.

Telegraph.—This, with the Ives and Hartford, ought to be melted up and cast into one good variety. There are enough good qualities in the three, if combined, to make one variety of surpassing excellence. They are nearly alike, and they are just good enough to keep, and too good to throw away. They are tolerated only for special reasons, earliness, etc.

Martha.—This might be melted in the same pot with the above, without hurting or benefiting the mixture. Wherever seen, and in my own grounds, the fruit was poor and foxy, and the vine neither healthy, vigorous, nor productive.

Aletha.—A supposed new grape found at Ottawa. After the most

careful comparisons, I pronounced it Hartford Prolific. The fruit of it and the Hartford were tasted by many in my presence, and none could find a difference. One of your committee found a very slight difference between it and the Hartford, as grown many miles away, and on different soil, but certainly the difference is not distinct enough to add another name to our long list of fruits.

Croton and Senasqua.—I found these growing nowhere except on my own grounds, where they have shown the very best of promise, but we can know but little from one summer's growth. Having seen and tasted the fruit of both, I know them to be grapes of remarkable goodness, if we can get them.

Eumelan and Walter—Were seen at only one point. There they certainly gave no signs of success in the West. The fruit of both is very good, and it is to be hoped that they will succeed in some localities, if not generally.

Lacon.—This has been fruited this season from Boston to Kansas in many different places, and the highest praise has been given to it by every one, as to the goodness of the fruit, and the health of the vine. The vine is not as vigorous in growth as some, nor so productive; yet it has perfect health and hardiness. The cluster is too small for a first-class market grape; flavor *best*, as a Labrusca. There are many other varieties that, perhaps, I should name, but I fear to tire your patience. My excuse is that I did not find any that I thought we had much use for, except those named.

I fruited this season, for the first time, a number of black seedlings of the Concord, but found no merits in them but what we already possessed in older varieties. Also a very pretty white one that utterly refused to ripen.

With a few general remarks upon the culture and pruning of the vine I will close.

Land, if prepared well enough to produce a good crop of wheat or corn, is well enough prepared to plant grape-vines on. If the land is rich enough to produce a very great crop of corn it is too rich for vines, causing too great and succulent a growth of wood. Land that will produce a little less than an average crop of corn, if dry, and with a porous sub-soil, is about right for most of our varieties. I have planted many vines in about our poorest Western clays and sands, without fertilizing them in any way other than by cultivation, and always succeeded in growing healthy vines and large and perfect crops of fruit. It is hard for me to conceive of a Western soil too poor naturally to make a successful vineyard, provided it is dry and not poisoned by mineral matters. A clean mixture of gravel and coarse sand would be the only one I would fear, and even this could be made perfect by giving it heavy dressings of clayey loam. I have never yet seen an instance in the West where ground had been trenched two to three feet deep, heavily manured, and the manure trenched in, but resulted in a disastrous failure when planted with vines, and I have seen many such experiments. What great good could possibly be obtained by the deep trenching of our Western soils? Would they not at the end of

three years, by the time the vines came into bearing, be as compact as they were at first? I think, if clay, the mechanical condition would be worse than at the start.

Exposure.—I have proven by experiment and observation, conclusively to my own mind, that a steep southern hillside is the worst possible exposure for a vineyard, and that a moderate northwestern one is the best, and, had I time, I could give the most convincing arguments in favor of this doctrine. But the simple incline of the soil one way or another need have but little to do in the selection of a vineyard site. Good success can be obtained on any exposure, except it be one that cuts off the morning sun entirely.

Planting.—Grapes should have more room than we have been in the habit of giving them. Say rows six feet apart, and the vines ten to fifteen feet apart in the row for the strong growers, and six to eight feet for the weaker ones.

Cultivation.—Vines should always, where practicable, be planted so that they may be cultivated both ways with the plow. While young they should have shallow cultivation, but when the vines are established they should have one deep plowing in the fall or early in the spring each year. This deep plowing should be east and west one year, and north and south the next. Put the plow in deep; never mind the roots; those you cut or break will be renewed with better ones, and those left intact between the vines will plentifully supply the vine until the new ones are produced. In this way is kept up a balance between top and root, which would be annually destroyed, else, from pruning the vine.

Pruning.—Any system by which a portion of the growth of the year before is pruned out in the fall or early in the spring, and by which the vine is kept securely in position, away from the ground, will produce an abundance of good grapes. But most intricate systems have been devised and practiced, some of them very faulty, for producing fruit of extra size and quality. I believe every system to be faulty that only admits of the vines being plowed in one direction. The so-called spiral system, as practiced to some extent around Alton, is one of the best. I have made a close study of them all, and not found one that was not faulty, though all will produce good grapes. A system with a fault should not be followed. If it is, the continued multiplication of it from year to year must produce ruinous results. I do not believe a vine without some length of trunk as old as itself is in a normal condition. Nature so designed them, and if it was not necessary she would have omitted the trunk, and the grape would have been a woody, herbaceous perennial, like the blackberry. All of the excretions of the vine appear to be thrown off with the old bark, and it is not only possible but propable that if the crude sap of our vines had some feet of old trunk to pass through before reaching the leaves we would have less rot, mildew, and other diseases among them. The plan that has the fewest faults, if I may judge, is a simple one that I stumbled upon when I first began to grow grapes, before I had read the books and become learned. (?) I since find it is the one almost exclusively practiced in the great vineyards of California, and very gen-

erally in Europe. It is simply to train up the vine the first or second year to a stake. Stop it the same season by pinching it off at three to five feet high early enough in the season for the upper buds to make shoots; cut these in, to one bud; lay the vine down in the fall and cover it with earth; take it up and tie to the stake the next spring; as it starts rub off all the shoots except two or three in the middle of the cane, and four or five at the top; those left near the middle of the cane may be allowed to bear a few bunches of fruit, but should be pinched back several times during the summer, and in the fall cut entirely off; let the shoots at the top grow as they will during the summer; in the fall cut half of them back to one bud, and leave the rest with from three to ten buds, according to the strength of the vine. These last will the next year give a fine crop of fruit without any summer pruning or other interference, though for extra fine fruit they should have their shoots pinched back as in other systems. Splendid canes will be produced from those cut back to one bud for the next year's fruiting. In the fall cut back the canes that have borne fruit, and properly shorten in the others; bend over and cover, and so on from year to year. While the vines are young the stakes should be set some distance from them, and the vines bent abruptly towards them and tied. This will cause them to grow obliquely, so that they will be less endangered by breaking when laying them down. We get, in this system, some length of trunk, a tree-formed vine of great beauty and weeping habit, with the fruit growing in the shade of the leaves; the leaves fully exposed to light; a chance to plow both ways; a very simple and easy mode of training, and can have more vines to the acre and have them do well than by any other way. These vines eventually, if not too high, become strong enough to sustain themselves without stakes, like the tree grapes of California.

Training on Trees.—When all things were created, our native grapes were given into marriage to the trees of our forests. To them they were to cling for support and protection. Man, in his self-conceit, thinks himself more wise than He who made him, and is trying to bring about a regular *Indiana divorce* between these loving parties. I say an Indiana divorce for the reason that the weaker and better halves' wishes are not consulted in the matter at all. The oak can live without the vine, but the vine, being dependent, languishes and grows feeble when deprived of its natural supporter and protector. I fear you will be disposed to look upon this as merely idle theory. It is not so, and deserves more interest than growers are likely to give it. Try the simple experiment of growing a vine on a scanty trellis; allow one shoot to escape into a tree congenial to it, and let it have its own sweet will. The result will create astonishment. Instead of a cane three to four feet long, with only a few joints of ripened wood, as you will find on the trellis, the cane in the tree will show you, perhaps, *twenty-five feet* of thoroughly developed and matured wood. The resulting crop of fruit will, accidents left out, show a like preponderance in favor of the cane in the tree. One accident that would destroy the result of the fruiting part of the experiment, would be steady, windy weather during the period of blooming, by blowing away

all the pollen from the flowers before fertilization took place. Vines growing in the forest are not liable to this accident, being surrounded by trees to break the force of the air currents, and by other vines to supply the missing pollen. All the trees of the forest are not alike congenial to the vine as a support. Some it utterly refuses to accept as such. Others absorb so much nutrition from the soil and air as to starve the vine. Others root too near the surface, or on the same plane in which the vine roots feed. Others cast too great a shade. All trees, I believe, of slow growth and deep feeding roots, are adapted to arboreal viticulture. I have observed splendid results on the wild gooseberry bush of our woods. The white oak, mulberry, and the Morello cherry family appear to be very congenial to the vine. But do not plant the black walnut for this purpose, as one did who wished to try the experiment, and base your conclusions on the result. This tree appears to be very pernicions to the vine. A vine growing on a tree or bush will need pruning as well as those grown in other forms; this can be readily done by means of a step-ladder, leaving the portions cut hanging on the tree; the tree may also be pruned in to any extent desirable. In vineyard culture the trees should be planted midway between the vines. For single specimens the vine should be planted ten to fifteen feet from the tree and trained towards it. This is no new system. Millions of vines are so grown in Italy and Southern France, and have been for centuries, with the best of success. If so well adapted to the old *Vitis vinifera*, that has had thousands of years of stake and trellis education, how much better should it be adapted to our more feral native species.

Growing the vine from Seed.—This is so easily done, and vines can be brought into fruit so quickly, that every one at all interested in viticulture should each year plant seeds of the vine. For only by constant reproductions from seed can our native species be educated or domesticated up to a point that will fit them for our artificial modes of vineyard culture, and the exposures inherent thereto. The Catawba may be named as an instance controverting this doctrine, it having been taken from the woods, but who can say but that this grape is the offspring from thousands of generations of cultivated vines, and is to-day the highest type of vine domestication to be found amongst our native species. Looking down the vast vista of time passed through by this our oldest continent might we not find a race of viticulturists learned in their art? Grape seeds may be treated the same as apple seed, and the seedlings grown with less care. Take them up the first fall and bury the roots out of reach of frost; plant them the next spring where you wish to fruit them, and they will show their character in from two to five years. They need have but little room for this test-fruiting. Rows four feet apart, and the seedlings a foot apart in the row will be ample. A majority of the seedlings raised by me have only male (staminate or barren) flowers, and these are, as a rule, the most handsome, hardy, and strongest growers. Is not here another hint for a lesson yet to be learned? All polygamous flowering plants, like the grape, have many that are individually pistillate, or partly so, and more or less barren from this cause. Do we not need

staminate plants in our vineyards as well as in our hop-yards? Would nature have produced so many staminate plants in this genus if they are not needful? Are seedlings grown from seed of imperfectly fertilized flowers to be expected to have the same vitality as those from abundantly fertilized ones? Questions that can only be completely demonstrated by practical experiments.

One very important point in the culture of the grape trained on trees I omitted to state in its proper place, which is: I have noticed that they are invariably freer from the depredations of leaf-destroying insects, and so far as observed, free from mildew.

I have not had time to make a report on other small fruits, and would suggest in lieu thereof, if the Society so wills it, that we devote a portion of our time to a full discussion of them.

D. B. WIER.

DISCUSSION OF TOPICS IN MR. WIER'S REPORT.

Dr. HULL appealed to Dr. Warder on the point of the fertilization of the flowers of grapes; whether it were possible for the pollen to be so entirely carried away by the wind as to prevent impregnation and cause barrenness.

Dr. WARDER replied that he had known Isabella vines growing upon the top of trellises, or on trees, lose their pollen by the wind to such an extent as to diminish their productiveness. Still there was but little danger in this direction. He spoke highly of the Martha. With him, and elsewhere in Ohio, it was one of the most profitable, productive, and hardy; was the only grape from which he realized profits this year.

Mr. WIER said that he had made many points, in his paper, *radical* on purpose to invite discussion. He stated that he had observed that the wind had sometimes forced the caps, or coverings, off the stamens before the pollen was sufficiently developed, or matured, to fertilize the pistils, and therefore no fruit was formed.

Dr. WARDER thought that training the vines on high trellises, or allowing them to ramble among the tree-tops, will not give immunity against the mildew. He thought no permanent success could follow the cultivation of foreign grapes, such as Mr. Wier anticipates; but did entertain high hopes of the production of improved varieties by hybridizing these and our native American varieties.

Mr. WIER found, by correspondence with eminent vineyardists, that the project of cultivating many foreign sorts was not abandoned.

Dr. WARDER stated that some of the foreign grapes—Golden Chasselas for instance—often succeed pretty well at first, bearing two or three crops, after which they gradually disappear from the gardens. Mr. G. W. Campbell, of Ohio, has some hybrids between native and foreign grapes which prove valuable. Mr. Campbell has also discovered a natural dependency or relation between the tendril and the fruit, so that he can tell, from the tendril of a seedling which has not yet borne, what

is to be the character of the fruit. (Dr. Warder did not describe the nature of these indications.) Another pomologist, he said, has shown that the color of the fruit could be foretold by observations of the leaves. As the leaves of the seedlings *color* on approaching maturity, so will the *fruit* color at maturity. For instance: if the leaves of seedlings are light and continue light colored, the color of the fruit will be light; but if they turn dark at maturity, the color of the grapes will be dark. Dr. W. also said that he did not think that strictly staminate plants are needful, in a vineyard, to secure continued fertilization.

Mr. WIER took issue with Dr. W. on this point; said, we can raise hops for a few years without staminate plants, then they fail.

Pistillate flowering grapes exhaust themselves, in their efforts to perfect their fruit without ample fertilization; and, after a few years, need staminate plants among them to secure continued vigor and productiveness.

Dr. HULL differed with the writer as to the cause of cracking in the Concord, attributing it to the rapid swelling of the fruit from the influence of heat and moisture. The Concord cracked, with him, after rains, and this could not be owing to drouth as stated by Mr. Wier.

Mr. WIER thought that the skins of the grapes became so hard, from drouth, that when rain *did* fall, they gave way.

Mr. GALUSHA said his observations of the cracking of the Concord coincided with those of Dr. Hull. The cracking of the grapes, in his neighbor's vineyard (where they cracked very badly), mainly occurred soon after they became colored, before they were ripe, and during warm, showery weather. The cracking gradually diminished as the grapes matured, although similar weather prevailed.

Dr. HULL was sorry Mr. W. did not tell us the conditions of success with the Catawba. The Ives colors early, but he doubts if it ripens earlier than the Concord. It keeps late. He also stated that at a recent horticultural exhibition in Iowa he had tasted good wine from Norton's Virginia, grown farther North than Mr. Wier's place. It was there regarded as a valuable variety.

Mr. WIER stated that the Norton's Virginia is not as valuable with him as the Catawba. That the Clinton is a better grape to be grown North than Norton's.

Dr. HULL said that his observations of the Aletha did not accord with Mr. Wier's. He stated, that although the flavor of the fruit was nearly or quite identical, the stem of the bunch was much longer than that of the Hartford, and the fruit ripened earlier. He thinks it can be grown a hundred miles farther north than the Hartford.

Mr. BALDWIN has known the Aletha a long time. Its quality is about the same as the Hartford, but it is about two weeks earlier in ripening.

Mr. HATHAWAY was also familiar with the Aletha (living in the same town where it is growing). His opinion coincides with that of Judge Baldwin.

Mr. PORTER also corroborated the statements of the last two speakers, adding that he had examined the two varieties, side by side, in Mr. Rugg's vineyard, in Ottawa. "The Aletha is eight or ten days earlier than the Hartford, and never drops its fruit, as does the Hartford." The vine of the Aletha is uniformly healthy and productive.

Mr. WIER said that the Hartford is variable in its time of ripening, and this may account for the differences noticed by the previous speakers. He explained one of the characteristics of the Hartford to be that the lobes of the leaves on either side the stem grow downward and approach each other, nearly, or quite, meeting at the stem. He noticed the same peculiarity in the Aletha as soon as he saw it. He had found Hartfords ripening as early as the Aletha. He believes them all to be *Hartfords*.

Mr. HATHAWAY affirmed that the leaves of the Aletha were more like those of the Concord than of the Hartford.

Mr. DUNLAP said that from the evidence given of its earlier ripening, he was convinced that it was a distinct variety.*

Mr. STARR protested against recommending the Clinton, either for wine or fruit.

Mr. WIER said that the Committee had tasted, during the year, a very large number of samples of wine, made from many varieties of grapes, but that they agreed in pronouncing a sample, made by E. Sanford, of Morris, from the pure juice of the Clinton, *the best of all.* This wine was several years old. He also said that on clay soil his Concords had cracked, but on sandy soil they had escaped.

Mr. DOUGLASS responded to a request, from the President, for his paper on Evergreens, reading as follows:

EVERGREENS FOR THE PRAIRIES.

I received a letter from our worthy Secretary, in which he says: "You are earnestly requested to furnish a paper (and read the same) at our next annual meeting, on 'Evergreens for the Prairies.' We want from you a list of a few of the most desirable and reliable varieties for artificial planting, for producing those modifying influences upon the atmosphere which our climate requires to render fruit raising pleasant and profitable. No one is engaged as yet to say a word about evergreens, and we must 'keep this subject before the people,' for I firmly believe that the horticultural salvation of our State depends upon planting other trees than fruit trees merely."

Well knowing the importance of this subject and the earnest manner in which the request was made, I could not decline, and only regret my inability to condense so much matter of such vital importance into a short essay.

We will begin with a few of the most desirable and reliable varieties

*NOTE.—As the vines of the "Aletha"—so called—are not far from me (25 miles), I will endeavor to examine both vine and fruit at different times during this year, and prove or disprove its identity with the Hartford.—*Secretary.*

for our purpose: Norway Spruce, Scotch, White, and Austrian Pines, Balsam Fir, and Arbor-vitæ. Here are six varieties, every one of which may be safely planted on the bleakest knoll that can be found on any prairie in our State. There are many other varieties equally hardy with the above, but these six are, all things considered, the best for a commencement. Combining hardiness, rapidity of growth, variety of form and foliage, they are adapted to all soils not absolutely wet or swampy, transplant well, and can be bought cheaper than any other kinds in cultivation. Some persons may say that the six varieties above named are not all hardy; that their arbor-vitæs were injured last winter. Now let us see about that.

We had an unprecedented hard frost about October 17th, last year, and after a very wet summer it found many kinds of trees, usually very hardy, with their summer growth unripe. It matters not how hardy the kind, a severe frost will kill the succulent, unripe growth of any tree. All the arbor-vitæs and junipers grow late in the season, and those that had not hardened up their growth at that time were injured more or less. No one will contend that the Norway spruce is not hardy; yet only a few years since we had a frost on the 5th of June, and the Norway spruces lost three to six inches of their leaders, or all the new growth, while the arbor-vitæs were not injured in the least. This only proves that the Norway spruce makes several inches of new growth, in spring, before the arbor-vitæ commences growing; as the other proves that the Norway spruce hardens up its summer growth before the arbor-vitæ.

It will be remembered that the 5th of June frost killed the new growth on all the hardy forest trees, and that the 17th of October frost killed millions of Osage plants, and injured every kind of deciduous tree that had not finished its summer growth.

Having satisfied ourselves that these six varieties are hardy, beautiful, easily transplanted, grow rapidly, and the lowest in price, let us plant them and see whether they produce those modifying influences referred to by our Secretary.

Many of you planted largely of evergreens twelve to twenty years ago. You looked carefully over the catalogues, and found very many desirable kinds; and wanting to test all the best varieties, you planted of them all. The next spring you found very many winter killed, and others injured; and finally at the end of two or three years, at most, after planting, you found them nearly all gone, except the six varieties already mentioned. You were discouraged, and your neighbor, who had not planted evergreens, considered yours a failure, but year after year came and went and your evergreens increased in size and beauty; you studied their habits, and learned that many kinds that would not stand with you the first winter could be grown successfully, if sheltered by the hardier kinds, and many of you have since planted the tender kinds that failed with you at first, and now find them succeeding admirably in the shelter produced by the hardier kinds.

Only a very few years since the "good old doctor," Kennicott, told this Society that there was "not a hemlock-spruce in a Western nursery,

five feet high, but had cost the nurseryman five dollars to grow it," and no one gainsayed it. We now find that if it is planted so as to be sheltered from prevailing winds, it grows finely.

No wonder a casual observer would be discouraged and say, "If the hemlock, that will grow north of the limits of civilization will winter-kill on our prairies, nature surely never intended them as a place on which to grow evergreens."

But the true admirer of this one of our most beautiful native evergreens would not give it up without first going to see nature and learn her mode of treatment, and was well rewarded for his trouble, for he there found out the whole secret.

Nature, knowing that the young hemlocks could not bear the parching winds, had varied from her general rule, and left the dead leaves on the young beech trees to protect them; and she seems to take pains to always sow the hemlock seeds among the beeches. We see by such cases as this that the man who first used "nurse trees" in his "pinetum" to protect the tender kinds while young, was not entitled to a patent; nature had practiced it before him, and it will continue to be practiced on your beautiful prairies, till these six "desirable and reliable varieties" have increased to sixty.

It is practiced already more extensively than some of you are aware of. Go to Arthur Bryant's, at Princeton, and see the kinds called tender, and the azaleas, the kalmias, the box, the holly; see his catalpas, large as forest trees—one on his lawn two feet in diameter, and loaded with flowers last June—all sheltered by these "nurse trees." Go to Lamoille. Samuel Edwards will show you more. He reports evergreens hardy with him, in the shelter of his larger trees, that have been pronounced tender at Philadelphia; and there are numbers of evergreens and other plants at both these places, and several others in different counties in our State, that can not be grown two hundred miles further south without the protection of larger evergreens, and many kinds that we tested several years ago, and could not carry through an ordinary winter, are now grown successfully by simply planting them on the sheltered side of the hardier sorts; and it well repays the planter, for it is a beautiful sight to see a feathery spruce, or towering pine, battling against the blast, and extending and waving its broad arms, as if intent on protecting the tender yew, or drooping cypress. We can not expect to be very successful with our fruit trees, while we are subject to drouths and tornadoes, and we shall be subject to them till we have the right proportion of timber as compared with cultivated land.

If seventeen per cent. is the lowest estimate for France, and twenty-three for Germany to give the best results for fruit growing and farming, how is it with us in Illinois? They have more protection, aside from timber, than we have—a hilly country, more or less, and to some extent bounded by the ocean, while we have a country comparatively level. Our prevailing winds pass over a parched desert, and we are far from the ocean, or any large body of water, except on the east, and have very little east wind in the growing season.

During the French Revolution, when the government forests were destroyed, perennial springs were dried up, and the fertility of the soil very much impaired; so much so that they were obliged to replant the forests, when springs that had been dry for many years burst out afresh.

No close observer will fail to detect the effect produced on his fruit trees by the west wind, when not protected by belts, buildings, or hills. They not only lean to the east, but the growth is most thrifty on the east side of the tree, the fruit surer to mature on that side, and fairer when matured.

The Proper Time to Plant Evergreens.—Judging from the many articles we see in horticultural papers, there is a great diversity of opinion about the proper time in the season to transplant evergreens. The best time to transplant evergreens is the best time to transplant deciduous trees, viz: as early in the spring as the ground can be got in good condition for planting. All extensive planters agree in this; but it is not always convenient to plant them very early, especially with nurserymen and farmers. Fortunately for persons so situated, evergreens can be planted later than deciduous trees. Indeed, they may be planted with perfect safety, under favorable circumstances, any month in the year when the ground is not frozen, only excepting the few weeks in which they are making their annual growth; and that time is from the middle of May till the last of June. (We are speaking of the spruces, pines, and firs; junipers and arbor-vitæs, grow later.) They can also be planted late in May and in June, if they have been dug before new growth commences; and even with a few inches of new growth, if moved in a moist day, not only small, but large evergreens may be planted and live. But late planting is not to be recommended, though the trees should all grow, for we often see nice symmetrical evergreens all live and hold their foliage well through the first season; but the next spring they are found to be shedding the leaves on their lower branches, and though they yet live, their beauty has departed.

Let us see why it is that these trees stood the first season so bravely, and are in such poor condition now. We say evergreens make their growth in June. Look at your trees in July; you will see the terminal bud formed. What is your evergreen doing for the next three months? It is "taking in supplies" for another season, and it needs all the time it has got to perfect its sap, harden up its new growth, encase its buds in resin to protect them in winter and nourish them in spring.

Your favorite balsam fir, that has to do a little more work in that line than the pines and spruces, did not get quite ready last year, consequently when the October freeze came it lost its leader and all the upper, thrifty, unripe branches, while the lower ones, that had made little growth, and had therefore time to ripen, were not injured in the least.

Your tree, planted at the time, or after the new growth has commenced, if the weather is ordinarily moist for a few weeks after planting, will make nearly as much growth as if it it had not been transplanted; but it is rarely able to prepare itself for a vigorous growth the next season; while a tree in every respect similar, if planted early, may look

dingy and bad through the chilly weather after planting, be later in pushing, and even make less growth the first season; but examine them in autumn, and you will see that the early-planted tree has its bud better formed, and is much stronger rooted than the late-planted tree.

I would not have it understood that the six varieties named are all that are hardy on the prairies without protection. Having been requested to name a few of the most desirable and reliable varieties, I chose these as combining the most good qualities, aside from hardiness, and will now name, from memory, many others equally hardy, viz: Red pine, pitch pine, yellow pine, Cambrian pine, black spruce, white spruce, red cedar, Siberian and several varieties of American arbor-vitæ, several dwarf pines, at least four or five medium sized pines—such as Banksia and Inops, many junipers perfectly hardy, several firs, among which are Pichta and Fraser's.

It would be hard to name, from memory, half of the very beautiful varieties that can be grown on grounds already sheltered by the common varieties, and we are adding to the number every year. I examined two new evergreens from the Rocky Mountains last week on the grounds of A. R. Whitney, Franklin Grove, Lee County: a white spruce (probably Englemannia), very beautiful, and coated over with a silvery tinge resembling hoar frost; the other, a fir, also very beautiful, and quite distinct from any other fir cultivated in the West. They have the appearance of being perfectly hardy, not having lost even a terminal bud in the five or six years they have stood on his grounds.

Mr. Snedecker.—Evergreens can be planted successfully in the winter with ball of earth.

Mr. Douglass.—Mr. Snedecker lives three hundred miles south from me. This makes it safer there. Evergreens can be transplanted at any time after the terminal bud is formed, when the ground is not frozen, though it is not as certain late in the fall. I once transplanted two hundred thousand (200,000) Norway spruce, commencing on the 25th of July. The ground being quite dry, we sprinkled thoroughly at planting; then cut branches from trees, and stuck down among them, so as to partially shade them. After working in this way four days, we took the branches used on the first day and used them for the fifth day, and so on, leaving the plants shaded about four days. The planting was finished September 14th. Those planted last did not succeed as well as those planted earlier. The plantation, as a whole, was a satisfactory success.

I prefer to take off all the dirt from the roots, keeping them damp, while moving. For trees of considerable size, the bottom of the hole should be crowning, so that the fibres will have their extremities the lowest when in position.

The soil *should be packed firmly* about the roots. There is little danger of packing moderately damp earth too closely. If the soil is dry, throw in plenty of water after covering the roots with earth, giving it time to settle away before completing the filling. It is better to plant large trees in this way than to move them in winter with a frozen ball.

Mr. Ellsworth.—Would Mr. Douglass recommend taking up evergreens from three to four feet high, from nurseries and planting in August?

Mr. Douglass.—I would not advise shipping, or moving considerable distances at this time; but they may safely be moved short distances. When planting such trees at this time, I would fill the holes nearly full of water, so as to have all the earth about the roots saturated, and settle the dirt into all the crevices among the roots. The *best time* to transplant evergreens coincides with the best time to plant deciduous trees, which is early in spring. Then, I say, *plant, if possible, early* in spring, though the trees will live, if planted later.

Mr. Periam, being absent, sent the following remarks to the Secretary:

"One of the most pressing needs of the West is trees for wind-breaks and timber, and yet our forests are being decimated from year to year without proper means being used to replace them. Enough has already been done, however, by individuals in different portions of the West to *prove* that timber may be grown with a profit to the cultivator, over and above its value as shelter to crops and stock. This fact alone should offer sufficient inducement to every prairie farmer to undertake its culture, so far, at least, as will inclose his farm, or principal fields. Among evergreens, the Norway spruce, white pine, arbor-vitæ, and red cedar, are the best for this purpose. The ground should be prepared in the fall. A strip about four rods wide should be plowed as deeply as possible, to let it have the action of the winter frosts. As soon in the spring as the soil is light and friable, it should be harrowed thoroughly; and if lumpy, the lumps should be crushed. Do not plant large trees."

At five o'clock, the Society took a recess until seven.

TUESDAY EVENING.

The Society re-assembled at seven o'clock, and was called to order by President Flagg.

The regular order of business for the evening was announced, and Dr. J. A. Warder, of Ohio, was called upon for his promised essay, which he read as follows:

VARIATIONS AND IMPROVEMENTS IN FRUIT.

To the Illinois Horticultural Society:

Fellow Workers:—You have asked me to contribute my small share toward the feast you have promised the horticulturists who attend your winter meeting.

My friends, those of you who have been in a habit of being present at these gatherings must have already become aware that since his first visit to your prairies—twenty years ago—your friend from Ohio has been coming among you, whenever he could do so, for the avowed purpose

of *gaining information from you.* This you have kindly allowed him to do.

As a slight return for your many favors, he can not be so churlish as to refuse the contribution of his mite to your treasury of knowledge.

When we look around us upon the beautiful panorama of natural objects, everywhere spread over the surface of the globe, we can not fail to be struck with the wonderful variety of objects that present themselves on every side. Among these, we, horticulturists, will very naturally observe and study the various plants that spring from the soil beneath our feet. These we find to be infinite in numbers, and of wonderful variety in form and coloring, as well as in size and habits. Some appear to be adapted to almost every kind of soil and climate, except to the regions of perpetual congelation. Even the arctic snows have their pervading whiteness enlivened by the warm and lovely tints of the *proto-coccus*, one of the simplest forms of vegetable tissue, which, though consisting of a single cell, compensates for its primitive organism by the immense numbers which are associated together.

Some plants are found only in the waters of ponds, or lakes, or rivers; others find a congenial home in the briny deep itself. Some, on the contrary, cling to the dead bark of trees, or to the barren surface of the granite and other rocks, where the mosses and lichens find a foothold, while they are sustained by the atmosphere. These are low orders of plant life, to be sure, but plants they are, nevertheless, and they are destined to play an important *role* in the economy of the universe, while, in the tropics, the damp and heated atmosphere of the forests sustains innumerable varieties of the most curious air-plants, many of which are famous for their large, richly-colored, wonderfully-shaped, and curiously-contrived flowers of rare beauty. Some vegetable forms feed exclusively upon living vegetable tissues. We find plants, chiefly upon the earth, supported by the soil, which, in the course of ages, has accumulated upon the surface of the globe, either by the residuum from the solution and removal of other portions of the subjacent rocks, *or* by the grinding force of ice and water reducing them to mud, and by the transportation of currents; in all cases, it is more or less affected, too, in its constitution by the decay of vegetable and animal matters, fitting it especially for the highest development of the numerous plants with which it is almost universally clothed.

Thus we find three of the great *elements* of the ancient philosophers are capable of sustaining vegetable life; the air and the water, as well as the earth, teem with plants. Among them all, we must be struck, even upon a casual examination, with the wonderful display of creative genius which they furnish, with the exquisite beauty which many of them present, with the remarkable order of their gradations—making a perfect classification possible, with their adaptation to the circumstances by which they are surrounded, and hence, with the manifest *design* or *purpose* for which they were created.

It is, however, with those plants that are nourished in the soil, that we, as horticulturists, are particularly interested; and among these we

shall, indeed, find a wide and a rich field for investigation, if we look into their history, study their inner life, look to the manner in which they are distributed, and learn how they are affected by the varying conditions with which they are surrounded.

In nature we find that plants are singularly distributed. Here, in the prairie region, the grasses, low, herbaceous plants prevail; beside the streams alone do we find the taller timber-producing families of plants, and these are here almost exclusively deciduous, while in other regions the whole surface of the country was naturally clothed with forests of majestic trees, and of these some have deciduous leaves, while others are evergreens. Look where we may, we shall, indeed, be struck with the richness of the variety of these interesting objects of our care and study, which can not fail to force the observer reverentially to acknowledge the existence of an All-wise Creator.

If we take a more limited survey of the plants under our immediate care or observation, however, we shall find variety also in this more contracted sphere; and it is particularly to the *variations found in some of our cultivated plants*, that your attention is invited this evening, when, by the request of your Executive Committee, I shall endeavor to discuss a few of the points connected with the *improvement of our fruits* by human *selection*, from among the curious variations that are observed in some of them.

First, then, let us ask what are these variations? in what do they consist? and afterward it may be well to inquire into their cause, or causes. We may ask under what circumstances they most frequently occur, and thus endeavor to learn how we may produce desirable changes, and how we can avoid those modifications which are undesirable, or even pernicious.

Variations consist in any divergence from what has been assumed to be the normal type of the species. These may be manifested in the habit of the plant, or in the mode of its growth—in the shape and other characters of its foliage, as in the Ring-willow—in the style of its inflorescence, as in the varying form and coloration, or in the modification and multiplication of the parts, as in double flowers—in the color, shape, form, and flavor of the fruit and seeds, as is fully exemplified in our orchards.

Thus it will be observed that variations consist in modifications of the non-essential characters, and that they must ever be confined within very narrow limits. If these were transcended, we should have a new species, whereas, in varieties, how dissimilar soever they may appear, the true specific characters always remain, though there be hybrids, which may come under our notice as variations, that will present some of the characters of two species.

For convenience of classification, plants with similar variations from the specific type are arranged in groups as sub-species, races, families, strains, and breeds, borrowing terms familiar to the breeders of cattle.

The definition of the word species has always been difficult, and it is yet a nice matter to say exactly what constitutes a species. The broad

distinction of non-production, when crossed, or of the progeny being infertile mules, is very clear and distinct evidence, but it is too broad, and it is found that some true hybrids are not infertile, but that they may continue their race by seed; and, on the other hand, some races or strains are equally infertile; nay, many are absolutely barren when let alone, and it is necessary to bring the pollen from another flower, or even from another plant, to secure impregnation of the germ. The principal characteristic of species is the power to reproduce beings like themselves that are also productive. A species may be modified by external circumstances, and thus give rise to races, or varieties, but it never abandons its own proper character to assume another.

In his great work on the "VARIATION OF PLANTS AND ANIMALS UNDER DOMESTICATION," Mr. Charles Darwin has brought together a vast array of most interesting facts upon this subject. Mr. Asa Gray, our distinguished botanist, and the American editor of the work, considers it "a perfect treasury of facts relative to domestic animals, and some of the more important cultivated plants; of the principles which govern the production, improvement, and preservation of breeds and races, and of the laws of inheritance, upon which all origination of improved varieties depends." It is not necessary for us to adopt, nor even to discuss, upon this occasion, the theories of Mr. Darwin, who "regards the present species of plants and animals as older and stronger-marked varieties, originated under *natural selection* of the sorts best adapted to the circumstances and conditions of each place and time," but, while many of the great students of nature seem disposed to adopt the Darwinian theory, as it is called, of progressive improvement, or development, there are others who differ from him; and the learned Duke of Argyll, in his philosophic treatise entitled, "*The Reign of Law*," clearly shows up some of the weak points of Mr. Darwin, and demonstrates that "natural selection," while it may have exerted a certain influence in maintaining and transmitting peculiarities, could never have originated them. He also shows that *selection* could never have created any thing. Still he admits that while "natural selection does not in the least answer the conditions which we seek in a law to account for the origin or the spread of such creatures as the various humming-birds, on the other hand, if I am asked whether I believe that every separate species has been a separate creation—not born, but separately made—I must answer, that I do not believe it. * * * The facts suggest to the mind the idea of the working of some creative law, almost as certainly as they convince us that we know nothing of its nature, or of the conditions under which it does its glorious work." (pp. 235, 236.)

The field of investigation presented by plants has been very thoroughly worked over by some most industrious and persevering investigators. Especial attention has been given to crossing plants. Mr. Sageret examined the melon tribes, *Cucurbitaceæ*, and other fruits. His results are confirmed by the testimony of Chevreal. In England, Mr. Andrew Knight crossed apples, wheat, and peas, among others, and he believed that his seedlings exhibited increased vigor and luxuriance.

Mr. Wiegman studied the cabbage, and speaks "with astonishment of the vigor and height of the mongrels, which excited the amazement of all the gardeners." "Mr. Chaundry raised a great number of mongrels by planting together six distinct varieties of cabbage," which proved more hardy than other cultivated sorts. Mr. Maund crossed varieties of wheat, and found that the progeny had greater vigor. Mr. Knight's crossed wheats were the only kinds that escaped the disastrous blights of 1795 and 1796, when almost the whole crop of England was affected. Mr. Clotzsch crossed different pines, oaks, alders, and elms, using distinct species, and having sowed seeds of the originals and those of the hybrids; the latter, though losing in "fertility, often gain in size and constitutional vigor." "All experimenters—Kolreuter, Gartner, Herbert, Sageret, Leecog, and Naudin—have been struck with the wonderful vigor, height, size, tenacity of life, precocity, and hardiness of their hybrid productions. * * * Some exceptions have been observed by Gartner and Herbert; but the most striking of these are given by Max Wichura, who found that hybrid willows were generally tender in constitution, dwarf, and short-lived."

Causes of Variation.—There are many puzzling questions in the study of Horticulture, some of which refuse to yield a solution to any thing short of a magician's wand. Look at our extended lists of fruits; examine the products, observe their varying shapes, colors, flavors, and qualities, as we gather them from our orchards, from our vines, and from our berry plantations, and who can say why the Almighty has framed them so wonderfully, and made them so to differ from one another for our use and enjoyment?

It has been *assumed* that these variations are due to the *changed conditions* of the plants of culture, which are often very different from those which are natural to the plants. Many of our farm crops, especially the grains, have been so long cultivated by man that their origin has been lost sight of; hence we do not now know the original type with any certainty. In these, it is easy to say that their tendency to vary is owing to *long continued cultivation.*

We may safely infer that the peculiar conditions surrounding our plants should have exerted an influence in modifying their forms and characters; hence, some writers have referred variation to *high culture*, on one hand, or to *starvation* and sterility of the soil, on the other. Excess of food might tend to extraordinary development, while starvation would naturally incline to leanness, or weakness and diminished vigor, in plants as well as animals.

Climate has been supposed to exert a very great influence in modifying the forms and characters of plants, and here we find that very narrow limits are allowed to some plants, while a wider range is possible to others. Each of our fruits seems to require a *given amount of temperature* between its blossoming and its ripening. This period may, however, be extended or curtailed for the same variety in different climates, but still within quite narrow limits of extremes and of mean temperature, and so we have ranges of latitude that are appropriate to

different plants, beyond which they can not be grown successfully.

Dr. Falconer, of the botanic gardens at Calcutta, in referring to the change of habit of the apple trees of India, where they become fastigiate, attributed this result to the heat of the climate. May not the *light* of a sub-tropical sky have exerted an influence upon these trees?

Crossing is well known to be a prolific source of variation, and in the hands of the florist this force has been made to produce the most wonderful results, when aided by his *selection;* so that we have single flowers made double, self-colored made parti-colored. Entirely new colors have been introduced, and the size, habit, and productiveness of plants have been wholly changed from those first observed in a natural condition. The gardeners have their secrets, as to different methods of treatment, which they may not be always willing to communicate. Perhaps it is not best that we should attempt to scrutinize too closely the mysteries of the potting-shed; but some of us are so selfish and so grasping for knowledge, that we do not like to see others, as selfish, who try to retain the secrets of the craft, which we should rather claim as belonging to the facts of science.

Pallas attributes all variations to the results of crossing. This mingling of plants would very naturally be looked upon as a source of variation; but if the members of a species be alike, how shall we cross different kinds without transcending the limits of the species, and thus producing hybrids, and these are more or less infertile? But if the parents be alike, whence comes the variation? That plants do cross in their natural condition, as well as when under the conditions attendant upon civilization, is a well-established fact. The pollen is constantly carried from one flower to the pistils of another, and this is especially effected by insects; nay they often carry it from one plant to another. There are some curiously formed flowers that never become impregnated by their own pollen, even when artificially applied by man, and his efforts have enabled him to obtain fertile hybrids between plants that are considered distinct species.

Mr. Salter, an eminent florist, who has been very successful in the production of varieties, assures us that the great difficulty in producing variations is to get the first break from the natural character. This once effected, the variations in the successive crops of seedlings goes on. You have witnessed this in the Petunia since Buist's "hybrids" were produced in 1836, when we had only the white and the purple species, from which have descended the greatly varying flowers of the present day.

On the contrary, an observation made within your own State, by our excellent friend, Douglass, does not confirm this in the case of seedlings of the oak-leaved mountain-ash, nor from the weeping variety of the same plant. From these trees he has saved the seeds, and grown seedlings in immense numbers, but among them all he has never observed one that had a heterophyllous leaf, nor a weeping habit. With slight exceptions, they all possess the normal characters of the species.

Bud Variation.—This is a curious mode of change in the habit and characters of plants that is a source of many of the variations in our plants. When we study the intimate relations and correspondences

which exist between the *bud and the seed*, however, which I had the pleasure of presenting before this Society upon a former occasion, it will not be any more surprising that a variation should occur in the shoot produced from a bud than in the developed *plumule* starting from a seed. The rule is uniformity, in both cases. The breeder's axiom, that "like will produce like," is the usual condition, and, fortunately, the common result, so that every cutting, graft, bud, and layer, that we use in propagation, or the tubers and seeds that we plant for our field and garden crops, will produce plants similar to those from which they were taken, and thus our varieties are continued indefinitely. But every now and then there is an exception to this rule; some bud will be found to have within itself the power of producing a different result. This is not unfrequently observed upon the plant or tree. The bud becomes a shoot that may have a weeping, instead of an upright habit; it may be clothed with abnormally shaped or with parti-colored leaves, and striped bark; it may even yield us striped fruit, like the *panache* pears, or, as in the apple, the smooth, and shining, striped surface of the *Benoni*, may be covered with a coating of russet. The *Neat Russet* may have a broad, clear stripe of deep red, or the *Milam*, its close congener, may be more or less coated with russet, so as to puzzle the most astute pomologist to say which is which. The Red Russet is supposed to be such a variation or *sport* from the Baldwin, which it closely resembles in habit of tree and in flavor of fruit. Some of the varieties of peaches have originated in this way, and are said also to perpetuate their peculiarities by seed as well as by bud. The nectarine and the peach are known to have mutually varied in this manner, and the former is believed to be only a bud-variation from the latter.

There is a very curious instance of bud-variation that occurs in the weeping willow, in which the leaves are changed from their normal condition to a twisted, or spiral form. This is known as the *Ring willow*, and by some supposed to be a distinct species. That this is only a sport, or bud-variation, is proved by finding the same tree reverting, in whole or in part, to the normal type of flat leaves.

Several of our favorite cultivated roses are also known to be simply bud-variations. One of the most remarkable of these is the common Old Red Moss, which not only has sported from the *Provens*, but which occasionally reverts back to the original smooth form, without the moss, sending up a shoot of this character, although it has long been propagated by cuttings that came true, and though its seeds have produced other varieties of mossy roses.

It is not at all uncommon to find marked differences in the form and coloration of the foliage of some of our native forest trees that are bud-variations, which, no doubt, are capable of being multiplied by budding or grafting, and thus treated, they would appear to be distinct species, to the casual observer.

Potatoes, of whatever form and color, may be safely planted with the assurance that we shall harvest a crop of tubers of the same shape and color; but this is not universally the case, for once in a great while we

shall find that both shape and color will vary, and these changed tubers may continue to reproduce themselves. The same thing has been observed in the propagation of the sweet potato—a red skinned variety will now and then be found to yield tubers without the color, *albinos*, if you choose, and these may continue to produce white tubers of the red variety, perhaps not differing in other qualities.

Grafting.—Mr. Darwin attributes variation to the effect of grafting. He quotes Cabani's assertion, that when "certain pears are grafted on quince, their seeds yield more varieties than do the seeds of the same variety when grafted on the wild pear." In the case of some of our American plums that reproduce themselves from seed, Downing asserts, that "when a graft is taken from one of these trees and placed upon another stock, this grafted tree is found to lose its singular property of producing the same variety by seed, and becomes like all other worked trees." On the other hand, the Heath cling peach, and perhaps some other very distinct varieties, though budded for many generations, retain, in a wonderful degree, their power of producing seedlings that possess similar characters.

As to variation for the sake of the improvement of the qualities of our fruits, and it is in this direction that we value these effects, let us see whether many of the changes have not occurred in a condition almost natural. How often we find the word *wilding* as part of the names of fruits in English catalogues, as we do the similar word *bezi* in the French lists of pears, and *seedlings* in our own reports, which are nearly all accidental products of the hedge-rows and fields. Besides these, we know by their history, that many others in all the fruit catalogues have had a similar origin, though their names do not indicate it. How few of our choice fruits have been the result of human efforts, for their improvement is quite as remarkable, as that, in a little more than half a century, so many of superior character should have been found, which are the result of spontaneous change or variation in the seedlings that have been allowed to produce fruit, even though there be but a very small proportion of the whole number planted. Indeed, we can not feel any great encouragement to look for decided improvements in our seedling fruits now that our standards of excellence have been raised to their present status.

In Horticulture, and in our horticultural studies, as already stated, we meet with many puzzles. We find many facts and conditions connected with them, in which we may perceive the *how*, but can not guess the *why* such things may be. The very classification of our plants and fruits is often obscure, and sometimes exceedingly unsatisfactory. Take an example in the grape, and see how greatly our botanists differ as to the number of species into which the genus may be divided. The wine grape of Asia, *Vitis vinifera*, embraces varieties that are very distinct, while, among the natives of our own country, we have quite a number of species, according to some authorities, many of which appear to be as closely related as some of the varieties of the foreign species. And when we agree upon any of the botanical classifications, we still find

the greatest difficulty in arranging our cultivated varieties under them.

With strawberries the same difficulty occurs in an attempt at classification, if we except the very distinct species of *Fragaria vesca* (?) and *F. elatior*.

In the apple there are not so many species, but innumerable varieties are in cultivation, all of which are referred to *Pyrus malus* and *prunifolia*, or to *P. baccata*, *coronaria* and *rivularis:* the latter, being American, are not prone to variation, can hardly be said to have yielded us any cultivated or improved fruits, although the *Soulard crab* be found in our western catalogues. This last, however, is one of the rare instances of variation of the species *coronaria* that is marked by improvement in size. Though it is considered by some to be an accidental hybrid with the *P. malus*, I can not so consider it; after having carefully examined its growth, foliage, and fruit, it seems to be a veritable and full-blooded *coronaria*.

After carefully examining all these possible causes to account for the curious variations which we may observe among our plants, we feel forced to admit our ignorance of the whole matter, and we are driven to the unsatisfactory conclusion that they must arise from an inherent faculty of the plants, which exists in them independently of any human influence in changing the conditions by which they are surrounded, whether as to soil, or climate, or other treatment and circumstances.

Certain it is that the close observer of nature will find these variations in nature, where, at least, there would appear to be no possibility of human interference. These freaks are of little or no consequence to us in the plants and animals of the wild prairie and forest, hence they are passed unseen and unnoted by most men, but in the domesticated plants and animals immediately under our care and protection, such changes are at once observed, and the changes are carefully noted, to ascertain whether they may affect our interests or fancies, and then they are either encouraged or counteracted, by careful selection, that man may increase and fix the new characters, or endeavor to obliterate them. This is exactly what is done by our judicious breeders and cultivators; and in this sense we may say that these variations are due to culture and selection.

It is a fact of no little interest to remark, that this tendency to vary from the normal type is much more frequently observed in some families, groups, and species, than in others; and thus, in seeking to produce any especial results of an abnormal character, it will be well to select those which may be found to be of the most impressive characters.

Therefore, in conclusion, it may be assumed, that with a view to the improvement of our fruits, we may, in most cases, confidently expect that among seedlings from cultivated plants, in which a series of variations has been already observed to exist, a certain proportion will continue to give evidence of departing still further from the type; whether this be in the desired direction or otherwise, it may be difficult to predict.

Acting upon this principle, we should be induced to operate upon an entirely different plan from that which was recommended by Van Mons,

who advised beginning with the wilding, and from its seed producing successive generations, in the hope of reaching improvement, or approaching toward perfection. The experiments made in this State many years ago by Mr. Brayshaw did not yield encouraging results.

Reference has already been made to the Duke of Argyll, and his admirable treatise upon "*The Reign of Law.*" Allow me, before taking my seat, to present to you his conclusion to the chapter devoted to the consideration of LAW in CREATION:

"It is the great mystery of our being, that we have powers impelling us to ask such questions on the history of creation, when we have no powers enabling us to solve them. Ideas and faint suggestions of reply are ever passing across the outer limits of the Mind, as meteors pass across the margin of the atmosphere, but we endeavor in vain to grasp or understand them. The faculties of both reason and of imagination fall back with a sense of impotence upon some favorite phrase, some form of words built up out of the materials of analogy, and out of the experience of a Mind, which, being finite, is not creative. We beat against the bars in vain. The only real rest is in the confession of ignorance, and the confession, too, that all ultimate physical truth is beyond the reach of science. It is probable that even the nearest methods of Creation, though far short of ultimate truths, lie behind a veil too thick for us to penetrate. It is here surely, if it is anywhere in the sphere of natural investigation, that the man of science may lay down the weapons of his analysis, and say: 'I do not exercise myself in great matters, or in things which are too high for me.'

"There is at least one conclusion which is certain, namely, this—that no theory in respect to the means and method employed in the work of creation—provided such theory takes in all the facts—can have the slightest effect in removing that work from the relation in which it stands to the attributes of will. All such theories are, and can only be 'simply questions of how the Creator has worked.' This is the confession made in respect to Mr. Darwin's theory, by one of the most competent of its supporters (Mr. Wallace). Creation by Law, Evolution by Law, Development by Law, or, as including all those kindred ideas, the Reign of Law, is nothing but the reign of *Creative Force*, directed by *Creative Knowledge*, worked under the control of *Creative Power*, and in fulfillment of *Creative Purpose.*"—*Reign of Law, Argyll, p. 272.*

In conclusion, with my thanks for your patient attention, I can only express my regrets, that, having undertaken the treatment of a subject, it has been found so extensive that it has been impossible to do more than enter upon the threshold.

DISCUSSION.

Mr. WIER—In the spring of 1862 I received cions of a Russet apple from France. One of these cions I grafted into a Willow twig apple tree, planted the spring before. The graft was forgotten, and left to work out its own salvation. Being in the centre of the top, and not so

strong a grower as the Willow, it had a severe struggle to reach the light. The summer of 1868 it bore several apples, which brought it to my notice again. These apples fell off before gathering time. The tree in which the graft was put was surrounded with Willow twig trees. While gathering the apples from the eight Willow twigs nearest and surrounding the one with the Russet graft in, we found on them russeted apples, and also on the tree with the graft in it. The apples borne by the graft are of the extreme russet order, dull orange in color. The Russet apples borne on the Willow twig branches were completely russeted, without any of the dull red color of the Willow, same color of the Russet proper, but with the exact size and form of proper Willow twigs. *We found no russeted apples on any others of two hundred Willow twig growing immediately around the one with Russet graft, except the nine spoken of above.* The apples, that fall of 1868, were barreled with the rest, and no attention given to them.

The fall of 1869 the Russet graft bore a very heavy burthen of apples. *They* were all on the ground at gathering time. We found more russeted apples on the adjacent Willow twig trees than we did the fall before, though there were *none* on the trees north and west; but to the south and east, they were numerous, and reached in that direction three trees farther than they did the season before! I now resolved to see how far the Willow twig apples were changed in character by the influence of the Russet; so I gathered about a peck of the russeted apples that grew on Willow twig branches, and put them in a barrel with proper Willow twigs. The Russet apples proper, from the graft, were fully ripe November 1st; the Willow twig, as is well known, is fully ripe May 1st, usually. On opening the barrel in which I put the russeted Willow twigs, about the middle of January, I found them very ripe, while the Willow twigs proper were as firm as when gathered! The character of the flesh and the flavor of the russeted apples was, as near as I could judge, half way between the Willow and the Russet.

Last season, 1870, the Russet did not fruit; but, Mr. President, if it does another year, and the results are as I have stated they were heretofore, I will make it my duty to exhibit the fruit to this Society. We have in this instance *positive proof* of the fact, that apples will in some instances be changed in character by the influence of another kind growing near them. My way of explaining the phenomenon is this: This particular russet has an abundance of pollen in its flowers possessed of strong individuality; this particular pollen fertilized the pistils of the Willow twig flowers, and the result was as I have stated. The above facts can all be substantiated by numerous witnesses. The fact that apples do sometimes, though very rarely, "mix" is of no practical importance, but, as a scientific fact, it is of great importance, for the reason that it has been repeatedly disputed by our learned horticulturists. It is a rare thing to see what we usually call the fruit grown from hermaphrodite flowers changed in character, even if fertilized by pollen from another hermaphrodite flower of very different character the same season. It is also rare, though less so, to see it in *polygamous* flowering

plants; but among *diœcious* and *monœcious* flowering plants such cases are very familiar.

Dr. WARDER mentioned several instances in which the Rhode Island Greening had become quite russeted when planted among Russet trees, or grafted into them. Pryor's Red also sometimes becomes quite russeted under similar circumstances, but reverts back to its original color after a few generations of cultivation at a distance from any Russet trees.

Mr. WIER—I thought the pollen from the Russet blossoms had fertilized the flowers of the Willow twigs, and thus produced the change.

Dr. WARDER—The fruit is not changed by the fertilization of its blossoms from another variety. This affects only the seed, or embryo of the next generation. The fruit from trees grown from seeds thus fertilized will be changed, or different from that of the parent tree.

Mr. MCWHORTER—Would cions cut from branches, whose fruit sported as in the cases named by you (Dr. W.), produce similar fruit?

Dr. WARDER—I would not look for a continuation of the peculiarity.

Mr. MCWHORTER thought that often the effect upon the fruit was owing to a change in the circulation. He once girdled alternate trees in an orchard, to kill them. That season the fruit on the girdled trees was larger and better than that upon the others. He thought that grafting upon dissimilar stocks produced the same effects. Grafting upon such sometimes changes the character of the fruit, without changing the tree.

Dr. WARDER cited the cultivation of pears upon quince stocks, as an illustration of this. The quality of some varieties is improved thereby.

Mr. WIER knew a persimmon tree (pistillate), which was girdled, and the fruit that year was three times as large as usual, and ripened earlier.

Dr. WARDER hoped that some attention would be given to improving the persimmon. It is more inclined to vary in its fruit than almost any other species, and by careful selections of seeds a really good variety may be obtained. In the tree spoken of by Mr. Wier, there may have been some staminate flowers.

Mr. BRYANT said that thirty-three years ago he brought some persimmon seed from Meredosia, Ill., and planted it at Princeton. He transplanted the seedlings at three and four years old, and about one half lived. Of these about half were barren, and the other half produced fruit, that of each tree differing from all others. They varied in size, form, quality, and time of ripening, there being about a month's difference in the maturing of the fruit. In some years, the later sorts do not ripen. This year all ripened, without injury from frost. The earliest ripening fruit is the best. It is often quite a good fruit, and is relished by many persons. While it is said that the frost ripens this fruit, yet it must attain a certain degree of maturity before the frost will ripen it.

A portion of the fruit ripens several weeks, sometimes, before the remainder upon the same tree will mature. In answer to a question, he said that this fruit did not grow spontaneously (or "native") in the region of Princeton.

Mr. ESSEX said that he found the persimmon growing wild, forty-four years ago, near Peoria.

Dr. SPALDING had noticed a difference of two months in time of ripening. The earliest were best; late ones were small and astringent. He had ten or twelve trees giving quite an assortment of fruit. He thinks these were all suckers from the same tree, but is not certain.

Prof. COMSTOCK asked if suckers from a staminate tree would ever produce fruit-bearing trees?

Dr. HULL replied that they might, as this tree sported very much.

Mr. BRYANT said that suckers from a bearing tree will bear fruit in three or four years from the transplanting, while trees grown from seeds of the same parent tree will not bear under about ten years; also said that seedlings are more difficult to transplant than suckers. They should be planted at one year from the seed.

Dr. SPALDING, in answer to a question from Dr. Humphrey, said, that suckers are safely transplanted by cutting their roots, or breaking the connection with the parent tree the previous year.

Mr. BIRD, of Iowa, asked if the qualities of the fruit itself would justify the planting and culture of the trees.

Mr. RILEY—The fruit sells well in St. Louis. The fact of the tree evincing such a disposition to variation should stimulate fruit-growers to experiment with it. I have known some varieties that were really excellent.

Mr. SHEPHERD had found that suckers produced fruit of same variety as the parent tree. He plucked fruit, from the same tree, from August to November; had trouble to keep his fruit, as he found every one was willing to partake of it.

Mr. BRYANT—The persimmon tree does not sucker so badly as to prove a serious objection to its cultivation.*

Mr. STAFFORD related a remarkable instance of variation or "sporting" in fruit. He said that he planted a Rawles' Janet apple tree in 1861. The first two years of its bearing it produced genuine Rawles' Janet apples, but had since (or for the last two years), produced sweet apples.

Mr. GALUSHA said that it was well known that there are two varieties of Carolina June apples. He had also, during the last year, found two distinct sorts of Snow apples (Fameuse), varying in their external appearance in the same way as the Carolina Junes do, viz: the one blush, or wholly red, while the other is striped. The striped variety is a little

*NOTE.—This habit of sprouting from the roots is hereditary to a certain extent, and is likely to increase with each successive generation of trees thus propagated.—*Sec.*

larger and has less acidity of flavor. The red one often often has a tinge of red or pink in the flesh between the stem and core. The trees are apparently identical. He knew nothing of the origin of this variation, for such it seemed to be, but thought the red sort to be a sub-variety originating from the seed of the other. Had never noticed the coloring in the flesh until this year. Saw the two varieties at Princeton and in Felix, Grundy County.

Mr. BRYANT bought trees in St. Louis in 1839 as the Minister apple; brought them to Princeton; grafted from them and sold the young trees as Minister, but when the trees began to bear, found that they produced a sub-variety of Snow apples. He has two sorts, alike in tree, but dissimilar somewhat in fruit, as has been stated.

Mr. MCWHORTER said that he knew there were two varieties propagated and sold as Snow apples, as there were two of Carolina Junes, yet he regarded them as distinct and originating from seed.

Mr. WOODWARD had also found this difference, and stated that the striped variety was a little earlier in ripening than the blush or red sort.

Dr. SPALDING said that a friend had called his attention to a very common, yet a very serious source of variation. He affirmed that *all sorts* of grapes were sold by *tree peddlers, grown from* CONCORD ROOTS. These his friend had called "TREE PEDDLER'S VARIATIONS."

Adjourned until to-morrow morning.

WEDNESDAY MORNING.

The Society was called to order by the President. Meeting opened with prayer by Rev. W. Beecher.

On motion of Dr. Hull, Mr. J. E. Starr was requested by vote of the Society to open a discussion upon the

TERMINOLOGY OF THE GRAPE VINE.

Dr. Hull had previously drawn upon the blackboard several illustrations of all the portions of the vine, to be used as aids in this discussion.

Mr. Starr proceeded to set forth in a clear, distinct manner the names appropriate for the different parts of the vine.

He said, that, having been appointed a committee by the Alton Horticultural Society to report on vineyards, he found that many of the terms used by him, in his reports, were not understood.

In endeavoring to remedy this, he had consulted various authors, and found that even they did not employ the same terms in describing various parts of the vine. He had therefore prepared and presented a nomenclature of the vine which had been adopted by that Society and which he would now briefly explain. We have

1. The ROOT—that part growing under the ground.
2. The STEM—that part between the root and the first departure.
3. The CANE—wood of last season's growth—prepared for fruiting.

4. Shoots—wood of the current season's growth, growing from the stem or spur.

5. Laterals—wood growing out from the canes, sometimes grown from shoots.

6. Sub-laterals—wood growing from the laterals.

7. Spurs—wood cut back for the production of new wood.

8. Arms—Canes laid down for fruiting.

9. Permanent Arms—Canes trained along the trellis permanently, for producing either fruit or wood.

10. Leaves.

11. Clusters.

12. Tendrils.

13. Joints—spaces between the buds.

Dr. Hull next used the diagrams to explain the Terminology of the vine somewhat differently from Mr. Starr. His terms are as follows:

1st. A Young Cane—a shoot of the current year's growth.

2d. A Cane—the ripened wood of the young cane.

3d. Branch or Stem—the cane which produces fruit.

4th. Fruit Shoots—wood from the branches that produces the fruit.

5th. Sub-shoots—wood (shoots) from the fruit shoots. Both new canes and lateral canes may be called canes.

6th. Spurs—canes cut back for producing fruit or new wood.

7th. Dormant Buds—those which do not grow till the second year.

In other particulars there was no essential difference between Dr. Hull's and Mr. Starr's nomenclature.

Judge Brown offered the following resolution, moving its adoption, viz:

Resolved, That a committee, to consist of Messrs. J. E. Starr, Dr. Warder, Dr. Spalding, Dr. Hull, Pres. Flagg, Mr. Shepherd, and Prof. Burrill, shall determine and settle the Terminology of the vine. Their report shall be placed in the hands of the Secretary for publication, if possible in the forth-coming volume of our Transactions, and the system agreed upon by them, shall have full authority, so far as this Society is concerned.

Mr. Ellsworth moved to amend by striking out all after the word "vine," and adding, "and shall report at this meeting." The amendment of Mr. Ellsworth was agreed to, and the resolution, thus amended, was adopted.

Reports of Vice Presidents being the regular order of business, the President announced Mr. J. W. Fletcher, of Centralia, Vice President of the Fifth District, who read his

REPORT OF THE FIFTH HORTICULTURAL DISTRICT.

Mr. President and Members of the State Horticultural Society:

I am compelled to offer you a meager report from the Fifth District, for the reason that I did not know the precise counties which composed

it, and expected, week after week, to receive a copy of the Transactions of last year, which would give the desired information, until it was too late to accomplish anything by correspondence. However, as a partial report may be better than none, I hasten to give you the result of such observations as I have made personally. As it is always in order, I will first mention the

Weather.—This trite and interesting subject, old as it is, is always new. The season has been a somewhat remarkable one.

We had an early and pleasant spring, though there was a sharp frost on the 15th of April, doing no serious damage, however. May was hot and dry, until the last of the month, when there were plenty of showers. Very hot weather in June and early July. On the 12th of July a severe storm of wind, rain, and hail swept over a section of country south and west of Marion County, destroying the peach crop, and doing considerable injury in several orchards in that vicinity.

The fruit crop of 1870 was quite a satisfactory one, so far as quantity is concerned, and generally of fair quality. Instead of being on the northern line of the peach-growing district, as has been formerly the case, Marion and Jefferson counties formed the southern limit, the fruit south and west of these counties having been destroyed by the hail storm before mentioned, and the frost on the 17th of April. For sixty or seventy miles north of Centralia the peach orchards have rarely borne much fruit, but this year yielded a full crop, of excellent quality. All of the small fruits were abundant, and prices remunerative.

PEARS did not do as well, and *apples* were decidedly a short crop. The "strawberry train" on the Illinois Central railroad commenced running on the 22d day of May, and ended the 9th of June. The "peach train" commenced July 28th, and ended September 16th.

The total shipments from Centralia for the summer were:

Strawberries	6,860 bushels.
Raspberries	2,300 "
Blackberries	4,340 "
Peaches	138,028 boxes.

In addition to the above, there have been large shipments made of grapes, pears, and apples.

"*Hale's Early*" *in Disgrace.*—As a rule, this peach suffered more than any other variety from decay. The reasons assigned for this are, that having a smooth, thin skin, and being early, it is very attractive to the curculio. Others think that such soil and culture as would give an excess in growth of wood might induce rot, while wormy trees, or trees on poor soil, would produce sound fruit. There was, however, one remarkable exception. In the orchard of Mr. G. H. Perrine were about four hundred and fifty trees five or six years old that were covered with sound, highly colored fruit; every twig and branch seemed to be filled. It was a sight that would gladden the eyes of any one, and of fruit-growers, especially. There were 2,350 boxes of Hale's Early gathered from this orchard.

CURCULIO.—Early preparations were made for a vigorous fight upon

the "little Turks." Curculio catchers were run in many of the orchards, and large numbers were destroyed. In some old orchards that did not bear much fruit last year, and especially those that have been cultivated, but few were found. A few persons still contend that it does not pay to run the curculio catcher, but the larger portion of cultivators esteem it a necessity. These men, however, also recommend plowing orchards in summer and late fall, as well as keeping hogs at work. In fact, a war of extermination must be kept up, and every method adopted that will help to dispose of the rascals.

Better Cultivation.—I am gratified in being able to report that fruit-growers are adopting a more thorough system of cultivation.

The old idea of planting trees and leaving them to shift for themselves, is pretty generally played out. It is becoming very generally understood that eternal vigilance is the price of fair fruit no less than of liberty.

In conclusion, I will only add, that the present prospect for a full crop of all varieties of fruit the coming year is favorable throughout the southern portion of the Prairie State.

Respectfully submitted,

J. Warren Fletcher.

Dr. Hull—The report says, that in some instances the running of the curculio catcher did not pay. I would ask Mr. Fletcher, if, in these instances, the forms of the trees were not such as to render it difficult to use it?

Mr. Fletcher—No; but these parties cultivated their grounds, and could not be made to see that they did not do as well as their neighbors.

Mr. H. J. Hyde read the following:

REPORT OF THE SIXTH HORTICULTURAL DISTRICT.

Mr. President:

It being so late in the season before I could get a list of the counties comprising the Sixth District, I shall not be able to present as thorough a report as I had hoped to at this meeting, but having written to leading horticulturists of each county, and as yet having received answers from three only, besides my own (Madison), I shall ask leave to submit to the Society for publication these several letters as a part of my report. There seems no lack of enthusiasm in Horticulture thus far in our district, although from the larger part of it, the last year's experience can be said in a few words to be a failure, and in looking around for a cause, we come to the conclusion that it was climatic; especially was it so in Madison County and south of it. The fall of 1869 was particularly favorable for trees, and they went into winter quarters with every prospect of a bountiful crop in 1870; and, indeed, up to the 16th of April we had good cause to hope for the best results. No fruit raised in our county gave any returns, except perhaps grapes, which were about half a crop. Of course there were some exceptions. In the summer we had a severe drought that seems to me to be particularly favorable for

insects, and they were as abundant as the most sanguine could wish for, and too much so to be profitable. It is a serious question with the most of us as to enlarging our fruit farms for profit. Are we not investing against our own interests? If we had no hope of a change it certainly would look unprofitable; but every year confirms what has often been said in our meetings, that to be successful we must labor; and to those who do not expect to make a business of fruit-growing, and calculate on hard work and close attention, I would say there is no field so open to failure as Horticulture, as many can attest who have tried it and failed; but to those who make it a business and take pleasure in their occupation, I still believe there is every reason to hope for a fair remuneration for their labor and capital.

The cry of an overstocked market has not yet, in my experience, been realized. The only fault I have to find is, I can not get enough fruit, and now, as California has entered the arena as a producer, it might be interesting to some to know how pears raised here compare in prices with theirs. My experience for two years leads me to say that they do not interfere at all, and I would be willing to furnish pears, at least some varieties, for what their freight and expenses cost them. To be sure we understand as yet they can produce them cheaper than we can, as the country is new and they have no insects; that they will have in the future, is reasonable to suppose, for such has been the history of all fruit regions. Apples were fair, but owing to the season they were at least two and three weeks earlier than usual. Winter fruit is not keeping well. There are but few in my county that grow many pears. Mine were very good and a fair crop; prices first-rate. Blackberries a good crop and extra prices. No currants nor gooseberries. Market gardening is attracting considerable attention, and I think will prove remunerative. I believe we shall succeed, provided we do not confine ourselves to specialties, but make mixed Horticulture a business and attend to it. The Alton Horticultural Society is in a flourishing condition, and there are others in our district doing missionary work. I expect to submit the letters and reports of local societies with a request that so much as is found of interest may be published in our reports.

Respectfully submitted,

H. J. Hyde,

Vice-President 6th District.

The following are the letters referred to in Mr. Hyde's report, and are appended as a part of the same:

Jerseyville, Jersey County, Dec. 5th, 1870.

H. J. Hyde:—*Dear Friend:*—I am happy to comply with your request, as far as my knowledge extends. First, Grapes. Mr. J. G. Schwartze has 5,000 vines, and has made, this year, 720 gallons of wine, and made an outlay of $10,000 for wine-making purposes. Mr. William P. Jarbo has 2,500 vines; has made 394 gallons of wine, and expended for wine-making fixtures, this year, $200. Mr. Cyrus Walters has planted, this year, 2,000 vines, expending $600 for vines and fixtures. Mr. F. Burtman has 2,000 vines, and has made 740 gallons wine this year. Warren and Pogue have 3,000 vines. This is the first year of bearing with this vine-

yard. The fruit was sold in St. Louis. There are, perhaps, 30,000 vines in the county, besides the above named.

There are five or six market orchards, containing from 3,000 to 8,000 trees each, consisting of apple and peach. Apple and peach orchards are also to be found on almost every farm, though they are generally small.

This county is under good cultivation, and nearly all divided into small farms of 80 to 320 acres each. The fruit from the orchards upon these farms is considered quite an important part of their products. Pears and the different sorts of berries are cultivated only for home consumption.

The sales of nursery stock in the county have amounted to from $3,000 to $5,000 annually for the last few years. Nearly all the nursery trees sold here are produced in the county.

The crop of fruit was not more than half an average crop this year.

Yours, etc.,

ISAAC SNEDEKER.

WOODBURN, Macoupin County, Dec. 6th, 1870.

FRIEND HYDE:—I am too busy to stop to say much touching the Horticulture of "Old Macoupin," just now. I will try, however, to give you a few items.

We have had a good crop of peaches and a fair crop of apples this year, and many Chicagoans, who wanted the same, have visited us. Also, purchasers have come from Indianapolis, St. Louis, and other towns and cities, attracted hither by the reports of our fine crop.

"Woodburn peaches" were quoted in the market, and A. A. Hilliard's cider stands second to none.

Pears, cherries, and currants were a failure. Blackberries, a full crop.

The apple crop generally paid well, and where the hogs and sheep have been free to run in the orchards, the fruit was quite fair and fine. We have heard less complaints of damage from insects than last year. Our apples, however, ripen earlier and decay sooner than usual.

On the whole, we feel that we have no sufficient cause for discouragement, as the general crops are good. We look for our largest profits, however, from our apple orchards. Many orchardists in the county sold their crops in the orchards at sixty cents per bushel, including many of the wind-falls.

Perhaps I can no better show the generally growing interest in Horticulture here than by stating the following facts:

Ten years since our County Agricultural Society offered premiums for fruits and flowers, amounting to *five dollars* in all, and its officers thought they were doing pretty well by these interests. In 1869 and 1870 the premiums for fruits and flowers averaged eighty-four dollars each year; besides, about forty dollars were offered each year for essays on Hedging, Orchards, and Home Adornment.

The reports of the State Horticultural Society show a larger average membership from Macoupin County for the last three years than from any other county in the State. This fact shows that the people of Macoupin are being horticulturally educated, and mean to take the front rank among the workers in our glorious cause.

Very truly yours,

JONA. HUGGINS.

Letter from Washington County:

RICHVIEW, Dec. 7th, 1870.

H. J. HYDE:—*Dear Sir:*—Yours of the 2d, asking for a short report of horticultural matters, was duly received.

In compliance with your request, I have to say, that in this county our experience of the past season, and our prospects for the future, are not very flattering. An untimely frost last spring almost entirely killed our peach and cherry crops, and

badly damaged our pears and apples. Small fruits generally escaped, and of these there was a fair yield, except of gooseberries. These mostly failed. A severe gale in July blew off a large per cent. of the apples and pears that escaped the frost of spring.

The season has been very favorable for the growth of all sorts of vegetation. Indeed, during the latter part of the season, altogether *too* favorable, as is feared, for the good of the *next* fruit crop. Peach buds, especially, are unusually far advanced, and large in size for the fall. Early cherries are in a similar condition, and, of course, are less able than usual to withstand a severe temperature. Grapes did very well, on the whole, last season, although the crops on the older vines suffered somewhat from rot. Blight in pears has, perhaps, been worse with us than before.

Insect enemies are as abundant as usual, and generally in proportion to the abundance of the particular sort of fruit to which they are partial.

Truly yours,

G. Wilgus.

A. M. Brown, Vice-President in the Seventh District, read the following:

REPORT OF THE SEVENTH HORTICULTURAL DISTRICT.

Mr. President:

Your Vice-President for the Seventh District has to make a rather unfavorable report of the fruit crop for the past season.

A very remarkable storm, beginning on the 15th of April, and ending on the 17th, destroyed all the peach germs throughout the district, with the exception of a few seedlings here and there. It also killed most of the pears, all the plums, and many grapes and strawberries. As this storm was an unusual one, an extract from my diary, noting its progress and severity, may be interesting. I will preface this by saying that peach trees were in full bloom as early as the 7th. At the beginning of the storm, plums and most varieties of pears were in full bloom. Strawberries had set part of their fruit, and the buds of grapes, generally, had pushed a half inch or more.

April 15th. Cloudy, but pleasant in the morning; some rain during the night. About 10 o'clock A. M. it began to rain and turn cold; wind from the north. Gradually grew colder and rained harder, and this continued until 9 o'clock P. M. when snow began to fall. At bedtime the mercury stood at 35 degrees, having fallen during the day from about 60 degrees. Strong wind from the north. Feeling very uneasy about the fruit.

April 16. Nearly four inches of snow on the ground and covering the trees. Mercury at daylight at 33 degrees. After breakfast the clouds seemed to be breaking away and the sun shone a little. Wind light, from southeast. Soon clouded and began to rain. The mercury ran up to 40 degrees toward noon, but soon began to fall again; snow melting rapidly. About 2 o'clock P. M. it began to snow again; wind southwest. The snow soon turned to rain, which ceased about two hours before dark; wind west. A little after dark the clouds partly gave way, and the stars shone dimly, but at 9 o'clock the clouds thickened with a

stiff breeze from the west, and the mercury precisely at the freezing point.

April 17. It continued cloudy all night, with considerable wind from the north. On getting up this morning, found it snowing briskly; wind north and the mercury at 28 degrees. The snow soon ceased, about an inch having fallen. Towards noon the clouds broke away, and the mercury went up to 44 degrees, falling about sundown to 42 degrees.

April 18. Clear, with sharp frost; the thermometer at 32 degrees.

The *Seckel* pears escaped almost without injury, the blossoms not being fully open. Some other varieties produced partial crops, among them Belle Lucrative, Easter Beurre, Duchess d'Angouleme, and Bartlett. Apples were more or less injured. In Union County, as I am informed, there was not more than one fourth of a crop, and there was not half a crop except in a few orchards, anywhere in my district. For some unexplained reason, my own apple orchard was but little injured by the frost, and most varieties, especially the late ones, produced very full crops. Although the young fruit and open blossoms were all killed, the strawberry crop was sufficiently abundant for the market. Plantations that had not been well cultivated the previous season produced poor crops, a drouth in the fall having prevented the plants from attaining their usual strength. Grapes, generally, made a pretty fair crop, notwithstanding the destruction of most of the first buds. Raspberries and blackberries were abundant.

The apple crop was considerably injured by the curculio, and, in some localities by the codling worm. The winter apples have ripened earlier than usual and many varieties rotted badly on the trees. Those most affected in this way, so far as my observation extended, were American Golden Russet, Northern Spy, and Jonathan. Smith's Cider rotted some on trees growing near other varieties that were badly affected, but were exempt in other localities. It is to be hoped that our State Horticulturist will tell us the cause of this apple rot, and, in order to bring him out, I venture the opinion that the cause is the same as in peaches and plums; namely, insect depredations..

The untimely October freeze of last year, which did so much damage further north, reached us also, but with less severity. In some places young trees were injured to some extent, and in some instances killed entirely. In the experimental pear orchard of my friend, Mr. Earle, where there are about one hundred varieties, many kinds suffered severely, as he has informed me, and some were quite destroyed. Fortunately those varieties that are relied upon for general cultivation escaped serious injury.

The past season was a very pleasant one and exceedingly favorable for all farm crops. The greatest heat observed by me was 96 degrees, and that but once or twice for a little while in the afternoon. Rains were plentiful everywhere in the district, and in some parts of it rather superabundant.

The President had known that at Centralia, with the mercury at 33 degrees, they had a good peach crop, but at Moro (his residence),

with mercury at 32 degrees, they had no peaches. He attributed this to difference in the stage of development of the fruit buds more than temperature.

Mr. ELLSWORTH said that it was unusual that the temperature was the same at the same time in two places, the one 300 miles directly north of the other. By referring to his memoranda of the temperature he found that on the 16th of April last, the thermometer at his place (Naperville) indicated 28 degrees at sunrise, 56 degrees at noon, at sunset 42 degrees, and at 9 o'clock 34 degrees. On the morning of the 17th a slight snow, with the mercury 30 degrees at sunrise; wind north; cloudy. At noon, wind north, clear, and mercury at 48 degrees.

Mr. TICE explained that these storms which sweep over the country are colder in their centers than at or near their edges. In Kansas, on April 16th, the thermometer was 18 degrees. At Springfield, Mo., 22 degrees; on the 17th, at St. Louis, 28 degrees; in northern Mississippi three inches of snow, and mercury 24 degrees; in Georgia, in many places, 26 to 28 degrees. That storm inflicted incalculable damage throughout its entire course.

Mr. BROWN—The severity of the storm was on the 17th in Southern Illinois.

Prof. TURNER had observed the operations of these cold storms for many years. We are always within a few miles of polar cold, and whenever and wherever these cold currents, which are constantly passing over our heads, dip down upon us, we feel them in proportion to the abruptness or suddenness of their descent. When these cold currents from different directions meet, the one is forced down upon us; hence the change in temperature depends upon the force of these opposing currents. Thus, in a cold storm, we notice at one point severe cold, then in a line with the storm we meet milder weather, while still farther on we may find it colder again. The cold "northers" of Texas are easily traced to this source.

Dr. SPALDING—On April 15th, peaches near St. Louis were in bloom. There was some snow, with mercury 28 degrees.

Mr. DAGGY, of Tuscola—On April 15th we had four inches of snow, which melted on the 16th. The mercury did not go below 30 degrees.

President FLAGG—Peaches were in bloom at Moro on the 14th of April. On the 15th had sleet and snow, with the mercury at 34 degrees at four P. M. April 16th, at seven P. M., the thermometer showed 32 degrees, and at nine P. M., 30 degrees. In the afternoon there fell two inches of snow. On the 17th the thermometer ranged 29 degrees to 30 degrees.

Dr. HULL said the mercury was 29 degrees to 30 degrees on April 17th at his place (near Alton). He had noticed several degrees difference between a thermometer hanging against a building and another at the same time in the open air, removed from the building. He thinks that there is often a sufficient radiation of heat from buildings to affect the mercury.

Mr. Galusha, from the Committe *Ad-Interim*, read his report upon the cultivation of the apple, as follows:

O. B. GALUSHA'S REPORT *AD-INTERIM*—APPLES.

To the President and Members of the Illinois State Horticultural Society:

In endeavoring to prosecute effectively the labor allotted to me by you, and especially by the members of the *Ad-Interim* Committee, I have traveled during the summer and fall sixteen hundred and eighty-five (1,685) miles expressly to visit orchards, vineyards, and nurseries, examining not only the appearance of tree, shrub, vine, and fruit, but also soils and sub-soils, and inquiring into the modes of culture and training that had led to the various results. It would be the work of an entire day to read the details of all the observations made and notes taken at all points visited, and would certainly be a foolish expenditure of the funds of the Society to publish them. I shall, therefore, in this report, give only such facts gathered as I think will throw light upon important points not fully understood or agreed upon among us; also such as may may indicate some desirable change in orchard culture.

The portion of work allotted to me, in the "division of labor" agreed upon by the *Ad-Interim* Committee, was to examine and report upon Apple Orchards. I shall, therefore, pass over all other fruits which were incidentally examined, reserving the privilege of writing out hereafter, for the next volume of "Transactions," such facts, if any, in the culture of these as may have escaped the observation of other members of the committee, or were noticed at points not visited by them.

Laying the Foundations for Longevity.—While it is a generally admitted fact that orchards west of Lake Michigan will not be healthy and productive under the same course of treatment or culture that would be successful at the east, it is not as generally conceded, if, indeed, it is scarcely thought of, that the peculiar treatment necessary to produce hardiness, productiveness, and longevity in trees here, *should commence in the nursery;* yet my observations warrant me in asserting, without a doubt, that this is generally true. As this paper is in no sense to be a list of *theories*, but rather a record of the results of *observations*, I will pass over the commendable experiments of those who are carefully saving all the seeds of the Siberian Crab apples at their command, and planting them, in the hope thereby of procuring a more hardy race of stocks upon which to graft the more desirable dessert and market apples.

I can not, however, pass these gentlemen by without bidding them "God-speed" in their hopeful enterprise, and expressing the hope, that these initiatory steps will, in a decade of years, result in placing such fruits as American Summer Pearmain, Jersey Sweet, Fall Pippin, Bullock's Pippin, Mother, Esopus Spitzenburg, Swaar, and Newton Pippin upon thousands of tables whose owners are now trying to satisfy their craving for fruit with such varieties as Ben Davis, Pennock, Willow twig, and

Stark, whose best recommendations are that the trees are hardy and productive, and that the fruit keeps well, and, like the razors in the story, is "good to sell."

The theory quite prevalent fifteen or twenty years ago, that root-grafted trees are less hardy and productive than those "top-grafted," seems to have quite generally yielded to the stubborn facts, which appear in almost every old orchard in the State, that variations in the health of any variety are as often in favor of one as the other of these classes of trees, and that the earlier productiveness of a variety by top-grafting is generally transient, resulting, as is well known, from a less complete, immediate union between stock and graft, and a consequent check or interruption in the circulation of sap, such interruptions always inducing the formation of fruit buds. Since, therefore, this earlier fruiting of top-worked trees is ordinarily but temporary, and at the expense of vigorous growth and development of the tree, no decided advantage can be claimed for it.

The practice of growing trees *closely together* (often as near as six or eight inches) in the nursery rows, and pruning them to single, naked stems to the height of four or five feet, is sure to produce that class of slender trees called "whip-stock trees," or "switches"—a class on which the "dealers" in trees make the most money, as a five or six feet tree of this kind weighs but a few ounces, and will pack in a small compass. Such trees, when planted in the orchard, are easily swayed about by the winds, not only because they are slender and top-heavy, but because they have less roots than those whose side branches have been allowed to grow. The lateral shoots always give size and strength to the trunk, and induce a corresponding growth of lateral *roots*, so necessary for holding the tree firmly in an upright position, as well as to furnish food for its growth.

These tall, slender trees, when planted in the orchard, soon become permanently leaned toward the northeast. Thus the naked trunks are exposed to the vertical rays of the sun at that time in the day when its beams have the greatest heating power. In a few years dead strips of bark upon the southwest sides of these stems show that the work of death is already begun. The borers and the bark lice are always ready to aid in the work of destruction, and the trees are *doomed* to premature fruitfulness, and premature decay.

I doubt not that I have seen this year in the orchards of the northern, central, and western portions of the State a sufficient number of apple trees to have cost *fifty thousand dollars* that are now in this condition, but which would have been healthy, if they had not been too closely planted and improperly pruned, while in the nurseries. I have also seen, in the northern part of the State, trees of the Jersey Sweet, one of our most tender varieties, that were healthy and productive, having been made so by proper care and training. Trees grown with "stocky" stems and low heads have a foundation laid for a long life of usefulness, and are well worth seeking out, and purchasing at almost any price. It is doubtful who are most in fault, that the best of trees are not planted,

the nurserymen who propagate them, or the farmers who will only pay a *price* for their trees that precludes the possibility of giving them the desired room in the nursery. I once heard a nurseryman say, "I have tried this plan of producing stocky trees, and it came near being the cause of my financial ruin, as they cost me twenty-five cents a piece, and I had to sell them for a shilling."

The plan of allowing a portion of the lateral shoots to grow as near as from two to three feet from the ground, for the first ten or twelve years, does not necessarily prevent the general and more full development of the higher and more permanent branches, for if they have been kept in check by shortening them in, from time to time, they may be then removed altogether, for the thick bark of the trunk and larger limbs is a sufficient protection to the alburnum from the effects of the heat of the sun.

There are exceptions to most of rules in Horticulture, as well as in other sciences and arts, and we do often find trees in the West that are prepared by nature to resist influences that would seriously damage nine tenths of their neighbors; yet I repeat that the *fact* that apple trees with tall trunks, and especially those that lean to the northeast, as nearly all such do, are not as healthy or long-lived as those whose trunks are partially shaded by their branches, *has been fully established* by observations in thousands of acres of orchards in all parts of the State. I found one orchard this year, however, that seemed to contradict preceding observations. This orchard (in Macoupin County) appeared as near perfection in vigor and productiveness as any old orchard I have seen in the West; yet the trees were trimmed up to four or five feet of trunk, and the heads were moderately thinned out. I remarked to the owner, who, by the way, had himself planted the trees about thirty-three years ago, that his orchard appeared to show an exception to the general facts that had come under my observation. On my explaining to him the nature of these facts, he rejoined: "Why, bless you; these were low-head trees when I planted them, and I never put the knife or saw into them until they had stood about twelve years, and from that time on I trimmed up and thinned out." The *explanation* was, of course, satisfactory. Some orchardists prevent the leaning of their trees to the northeast by planting them with their tops inclined to the southwest, securing them in this position by stakes and bands of straw. The tops thus inclined shade the trunks somewhat, and the rays of the sun that do strike them do so at such an oblique angle that their effect is not damaging.

I have been thus definite in giving the causes and preventives of this premature decay in so many thousands of our orchard trees, only *because of its extent*, and because the preventives are mainly at the command of every tree-planter.

Insects.—Several species of the insect enemies of the apple have been more numerous this year than heretofore. The codling-moth, tent-caterpillar, and leaf-roller have been far more destructive than I have ever known them to be.

It is probably safe to estimate that four out of five of all the apples in the State that commenced growth in the spring were destroyed or injured by the codling-moth before they reached maturity. From some entire orchards, in the Alton district, that were full of fruit, not a bushel of sound apples could be gathered. In the young and isolated orchards of the more recently settled portions of the State the damage was least, yet no locality was exempt, and no orchard visited showed more than one half its fruit sound.

Measures have been adopted by a few persons to destroy the larvæ and pupæ of these insects. Those who have tied rags or strips of cloth around their trees just below the lower branches, or placed them in the forks of these branches, have found plenty of enemies secreted in them, as often as once in ten days, ready to be scalded to death. Those who have allowed their hogs to run in their orchards for several consecutive years from June to October have been rewarded with a larger proportion of sound apples than their neighbors, who used no precautions. There are others who diligently pick up the fallen fruit as often as once in two days, and feed it, either cooked or raw, to their swine, and thus secure a greater immunity from the ravages of this insect for the next year. If this practice of using the loose cloth bands be accompanied by that of picking up and destroying the fallen fruit, and these measures be followed up by *scalding the barrels*, early in the following spring, in which the apples have been stored in the cellar, the increase in the value of the succeeding crop will more than repay the labor. If any one doubts the utility of scalding his apple barrels, let him go to his cellar and loosen the hoops of barrels containing apples, and he will become suddenly convinced that it is not safe to neglect it.

While examining some of the old orchards at Princeton, this fall, I was invited by the proprietor of one of the best of them to look at his fruit, of which several hundreds of barrels were stored in a shed ready for shipment. On loosening the upper hoops to take out the heads, a dozen or more of the larvæ of this moth were dislodged and dropped to the ground, while others had partially enclosed themselves in cocoons, and still adhered to the hoops. The same appearance was seen in and about the grooves of the chines. The fruit, large, and finely colored, was already beginning to decay. It is well known that the codling-moths emerge from these cocoons in spring, and find their way out of the cellar or fruit rooms into the orchards; and since each moth deposits two hundred or more eggs in as many young apples; and further, when we consider that this insect is "double brooded" (has two broods yearly), the importance of destroying them while in the larval or pupal state, is apparent.

The APPLE LEAF-LOUSE, (*Aphis mali*), which was so destructive last year, has not been found to any great extent this year. This fact, together with the almost entire absence of the scab upon the apples, goes far to corroborate the opinion given at our last meeting by the State Horticulturist, that this insect produced the scab by puncturing the skin of the fruit, and sucking its juices.

The LEAF-CRUMPLER has been unprecedently abundant, in some localities, the past season, doing serious damage, especially to young nursery trees, in checking their growth. These pests are *now* easily found, closely done up in their slender, tough cases, attached firmly to the twigs, and surrounded with small bits of dead leaves, which they destroyed during the summer. The diligent and really prudent nurserymen and orchardists will not fail to pick off and burn these enemies. As this work can be done at any time during the fall and winter, there is no reasonable excuse for neglecting it. In some of the nurseries, it will probably cost fifteen dollars per acre to clean the trees from these unsightly pests.

The SCALY BARK-LOUSE, while holding its own in some localities, is, on the whole, diminishing. Those who have stimulated their orchards into renewed vigor, by means which I shall soon mention, have, to a great extent, counteracted their effects, and diminished their numbers. Several persons in this county (Grundy) report that they have applied a light coat of linseed oil, with a common paint brush, to the infested trunks and branches of their trees with marked benefits, in both destroying the insects and producing a clean, vigorous appearance to the trees. The hope is often expressed, that the parasite which our lamented friend Walsh discovered preying upon the eggs of these insects will so far hold them in check that they will be comparatively harmless for a few years to come.

The extreme drouth of the season seems to have been favorable for the multiplication of TENT CATERPILLARS. The orchards upon some of the large farms have shown many trees full of fruit, yet denuded of leaves. Of course there is no valid excuse for this state of things, as this enemy is so easily destroyed. It is usually the slovenly farmers, or else those who can see value only in steers, hogs, or corn, whose orchards are thus infested. The fruit upon such trees, though insipid, is usually colored well, and "will sell with the rest."

Cultivation of Orchards.—So much has been published in our agricultural papers, and talked in our horticultural meetings, about the richness of prairie soils, justly cautioning persons planting trees upon these new soils against using manures, that the opinion has become general that it is dangerous *ever* to manure an orchard, and hence nearly all neglect to furnish the needed food for their trees when they come into bearing.

Having been constantly "cropping the soil" among their trees during the years of their growth, it becomes somewhat deteriorated, and when the trees begin to bear crops of fruit, they draw still more heavily upon its resources; and because additional food is not supplied, they become checked in growth, and a more ready prey to the bark lice and borers. I will cite two cases, which will show both the trouble and the remedy. The one is at Farm Ridge, La Salle County. I quote from my notes taken in the orchard:

"Orchard planted in 1851. Trees cultivated for three years, then ground seeded to timothy. Soon commenced bearing, and bore tolerably

well for a few years, then the trees gradually stopped growing and became unproductive, and many trees covered with bark lice. Two years since they were washed with lye and pruned, the ground broken up, and well cultivated. The trees have renewed their vigor, are nearly free from bark lice, and loaded with fruit, which, but for the codling-moth, would be very superior. Soil is ordinary prairie, with lime rock about five feet below the surface, sufficiently inclined to be surface drained."

The other orchard that I instance is in Grundy County, on moderately rolling prairie land, with clay sub-soil. I also quote from notes of this orchard as follows:

"Orchard planted seventeen years ago. Present owner came into possession two years since; found the orchard 'in a deplorable condition;' trees stunted and lousy; had been seeded down to clover, he knows not how long, and crop saved for hay. Two years since he dug up the earth under the trees *as far out as the limbs extended* and spread manure over the ground, putting it thicker where dug than on spaces between the trees; scraped the rough bark from trunks and largest branches; mowed the clover and let it remain on the ground. The same, except the scraping, was repeated this year. This orchard now shows almost perfection in vigor, productiveness, and quality of fruit." I think the fruit from an acre will bring more money than from any other one seen this year.

Before leaving this subject of cultivation, I will say that orchards upon what is called "flat prairie" land, or that with just enough descent —and nearly *all* prairie has this—to let the water pass off in furrows, have been found doing tolerably well wherever the trees had been planted upon a slight ridge or back-furrow, and the land afterwards plowed towards the trees until the surface along the rows was about two feet higher than in the furrows between them, ditches being opened at the lower ends of the rows through which the water can pass off. This fact should encourage all who have *only such land* on which to plant, to do likewise in hope of good returns.

Protection to Orchards.—There has been no new light thrown upon the subject of timber protection to orchards during this year. The oft-repeated view of many members of this Society that suitable protection to orchards by belts and groves of timber is advantageous, seems to be re-affirmed from year to year. I have, however, seen a few instances in which an excess of protection seems to have been given, diminishing the productiveness of the orchards. These orchards were closed in on all sides but the south by belts of trees, so dense and so close to the outer row as to prevent sufficient circulation of air through them. It has often been said that certain kinds of trees are "poison to an orchard." I give the following facts to induce observations in this direction:

On the east side of an orchard in Kendall County stands a closely planted row of black-walnut trees about forty feet high. These trees were planted at the same time as the orchard, viz: twenty years ago, and twenty two feet from the outer row of orchard trees. The apple trees in

this row commenced failing about ten years since, and continued to become more and more sickly and starved in appearance. One after another has died until there is but a single live tree left in the row. The next row, twenty two feet from this, does not now appear as vigorous as the rest of the orchard. There is no noticeable difference in the soil or elevation between this side and the other portions. No effort was made by the owner to save the trees, the whole orchard having been seeded to timothy for a number of years, but was cultivated until it came into bearing.

The instances of close protection mentioned can not be claimed to affect the general rule that the shelter afforded by belts of timber or natural groves on the west, north, and southwest, at a sufficient distance from an orchard so as not to damage it by its shade, confine the air too closely, or rob the soil of sap that would otherwise go to nourish its trees, are always beneficial. It is often remarked that, in orchards which are exposed upon the west sides, the same varieties in the middle of the orchard produce more fruit than in the west row; also, that the northeastern halves of trees in the west row usually produce more fruit than the southwestern halves, owing to the greater prevalence of southwesterly winds.

Siberian Apples.—As there has been much written upon the value of new varieties of Siberian apples, and some efforts made in propagating them, especially in the Rock River district, I visited this locality the last season to learn what I could, by conversation with persons in the neighborhood of the bearing trees, as well as those engaged in the propagation of young stock from them; to see the trees, and to see and taste the fruit. I will say nothing of the *quality* of these "winter varieties" of crab apples, as the owner of the trees will doubtless have the fruit on exhibition at this meeting, for the purpose of having it tested by the members of this Society; and the report of the committee appointed to examine and report upon the fruits on the tables, will be of far greater value than my opinion. The *trees* appear to be all that could be desired. The "Marengo" especially is beautiful in form and of large size for a crab apple tree. I did not learn anything while there to warrant me in recommending these apples as market fruits for this State. Since there is not much superiority claimed for them over our other Siberian varieties, except in their "*keeping* qualities," and since the chief use of such fruits is and must continue to be for jams, jellies, preserves, and pickles, the keeping qualities are not as advantageous in them as in varieties suited to the kitchen and table. For northern localities, where the more tender, cultivated varieties can not be grown, they will doubtless be of value, and also, to nurserymen and orchardists of our own State, to use as stocks for more valuable varieties. As I before stated, there is much hope of benefits from the use of such stocks, and also from the introduction of valuable Russian varieties. The Commissioner of Agriculture is entitled to the gratitude of the members of this Society for the interest he has taken in procuring and distributing cions of so many varieties of Russian apples.

Seedling Apples.—I have found several valuable seedling apples

during the season, and others have been reported to me; some of which will appear on the tables at this meeting and to which I ask the attention of the committee on fruits. I am glad to say that there is among fruit growers *generally* such a spirit of philanthropy and liberality that those who have discovered valuable varieties among their seedlings are willing that others should share their good fortune and will bestow cions gratuitously on those who wish to test them.

Varieties.—It may be expected that I would report upon the varieties that I have found to succeed best in the different localities visited. This would be an almost endless task, and the lists would be necessarily imperfect, and therefore could not be taken as correct, and the only guides to tree-planters.

Your Secretary has secured for publication in the volume of Transactions for 1870, lists of valuable varieties of fruits from the most experienced fruit-growers in different parts of the State, which will be valuable as guides to planters in these respective districts. I will therefore only mention a *few* sorts that are found generally satisfactory. Of those that seem to do well in *all* parts of the State, I will name Sops-of-Wine, Keswick Codling (short-lived but very productive), Benoni, Carolina June, Maiden's Blush, Ben Davis, English Golden Russet, Willow Twig, Lowell, Little Romanite, Rawles' Janet, Jonathan, White Winter Pearmain (free from scab this year).

In addition to the above, the following have been found valuable throughout the northern half of the State, viz:

Fameuse, Fall Swaar, Fall Winesap, Autumn Strawberry, Duchess of Oldenburg, Sweet June, Northern Sweet, Tolman Sweet, Domine, Westfield Seek-no-further, Minkler, Fall Orange, Roman Stem, Stannard, Swaar, Cayuga Red-streak, Holland Pippin, Ramsdell's Sweet, Fall Wine, Barnhill's Summer.

The Early Pennock does well on rich prairie soil, but this and the Winesap do not flourish on sandy land. The fruit of Carolina Junes, both of the striped and blush-red varieties, was extremely fine this year. I found two distinct varieties of the Snow apple (or Fameuse), varying in appearance in the same manner as those of the Carolina June. The striped variety has less acid and is generally a little larger than the full red variety. The flesh of the latter is often tinged with red, especially between the stem and the core. The Esopus Spitzenburg, Rhode Island Greening, Vandevere, Baldwin, and some others that have usually been found unprofitable, have this year borne good crops of fine fruit.

I will leave this topic by again referring the hearer and reader to the lists spoken of, which, I trust, will reach them in time for planting trees in the spring.

The discouragement manifested throughout all the prairie regions of the State during the last few years in regard to the adaptation of our soil and climate to the cultivation of the apple, I attribute largely *to shortness of memory* in the orchardists. We can remember the universal wail that went over the State in the spring of 1856 when it was discovered that a wholesale destruction had swept through our orchards. Few persons, at

that time, had any hope that those trees which were not "killed outright" would ever recover from the shock which their trunks and limbs had sustained, for the heart-wood of all was blackened and discolored. While many of these have succumbed and died from year to year, yet a majority have continued to struggle on and have, fortunately outstripped the then hopes of their owners. Let the possessors of all such trees recall these facts and turn their attention to these veterans in the war against fate, giving them such cultivation and stimulating food as their enfeebled constitutions require, and they will doubtless live yet many years, and doubly repay for all the labor bestowed upon them.

We may all encourage ourselves with the hope that the "like of that winter" may never recur again. The orchards which have grown from the seed since that memorable winter (except those grown after "the Shanghai pattern" which I have described), are generally in as flourishing condition as any reasonable person can ask.

The apple crop of this year has been, as a whole, much larger than ever before, and the consequent increased consumption of fruit will create an increased demand in future.

If we, as a Society, can persuade men by our examples as well as our precepts, to properly select, plant, and *cultivate* their trees, using with diligence the means discovered, and discovering for overcoming insect foes, we may hope that soon the supply of this health-giving fruit will be such that all may have an abundance.

Respecfully submitted,

O. B. Galusha,

Committee on Apple Orchards.

Mr. W. H. Ragan, Secretary of the Indiana State Horticultural Society, stated that he had received cions of the Russian apples from Commissioner Capron.....[Most that Mr. R. said was not distinctly heard by the Secretary. In fact, the construction of the hall seemed to be very unfavorable for the purposes of discussion, it being often times almost impossible to catch the words of the speakers.]

Mr. Galusha, being asked to explain the offer of the Commissioner of Agriculture, did so by saying, that upon seeing the telegram from Washington that Mr. Capron had received a quantity—400 varieties—of cions of Russian apples for distribution among horticulturists of the states, especially those of the West and Northwest, he immediately wrote him soliciting a portion of the cions for distribution among the members of this Society. He also asked the Hon. B. C. Cook, the Representative in Congress from his district, who was then on his way to Washington, to call on Mr. Capron as soon as he arrived there, and personally apply, in behalf of our Society, for some of these cions. Mr. Cook complied with the request, and both he and Mr. Capron had written letters, stating that a package had already been sent to the Hon. W. C. Flagg, President of our Society, for the use and benefit of its members.

Mr. G. said that he deemed it important that these cions should be used to the very best advantage, for from them we may hope to introduce a class of good fruits of so hardy a nature as to withstand our trying climate. If these cions are distributed at once among the members, it is quite probable that some of the varieties, and perhaps the most valuable ones, would be entirely lost, since all had not the skill or facilities for grafting them successfully; and since there would be but a few buds of any one variety, he thought it better that some careful person, who has young, thrifty two or three year old trees on which to graft them, should be requested to take the whole lot, engraft them on such trees, keeping a careful record of the varieties, and in the fall cut off the growth, except the two buds at the base of each shoot, which will amply repay him for his labor, and bring the cions thus grown to the next annual meeting of this Society for distribution among its members. In this way it is probable that all can receive at least a moiety of this gift. But if the few now to be received are distributed at once, they must necessarily fall into the hands of a few members, and thus the temptation would be offered for monopolizing them. He, therefore, offered the following resolution, and moved its adoption by the Society:

Resolved, That a committee of three be appointed to select some suitable person, whose duty it shall be to receive the cions of Russian apples sent to this Society from the Commissioner of Agriculture, graft them, and furnish this Society, at its next annual meeting, the product of their growth.

The resolution was seconded.

M. L. DUNLAP said:

Mr. President, I trust this resolution will not pass. This State is already flooded with unreliable varieties of apples. The people of Michigan have been growing apples for many years, experimenting with a great variety of sorts. Now, the Rhode Island Greening, the Esopus Spitzenburg, the Northern Spy, the Baldwin, and the Roxbury Russet, these four varieties are the leading commercial varieties of that great apple-growing country.

What is *our* position? The Willow twig is head and shoulders above all others as a long-keeping market apple. Sops-of-wine, Porter, and Rambo are among those now considered as best. Shall we now disseminate four hundred more untried kinds? No. Let them go into the hands of those who are willing to try them. We have an Industrial University in this State, in whose Experimental Horticultural Department fifteen hundred varieties of apples are now under cultivation. This department was created partly for this very purpose of testing varieties, retaining the valuable and throwing the useless or unprofitable away. Let these go there, and be fairly tried at the expense of the State, and for the benefit of the whole State, if, indeed, any benefit may result from them. It is doubtful, however, if more than two or three out of the whole four hundred will prove valuable. We have now the Duchess of Oldenburg, the Tetofsky, and Red Astrachan from that country that are valuable, and may possibly find as many more. But this hope is so faint, let us not, in pursuit of it, dis-

tribute these four hundred unknown and doubtful kinds all over the State that our members may destroy or injure many of their valuable trees by cutting off the tops to make room for these, only to find, to their sorrow, that they have received an evil for the previous good, besides losing much valuable time.

He said he would first prefer to put them into the care of the University, but would be willing to entrust them to some nurseryman who could afford to test them.

Mr. GALUSHA—I thank the gentleman for what he has said in reference to the province of the experimental orchard of the Industrial University, and fully agree with him that this institution is doing a good work in testing so great a variety of trees and fruits. Yet I do not wish any one person, society, or institution to monopolize any valuable gift or any bounty of Providence. I will explain that the Industrial University was served *first* from this lot of cions. There are already, doubtless, a much larger quantity and more varieties sent to that institution than we shall receive.

Mr. D. seems to suppose that a large box, containing four hundred varieties of strong cions will be the portion which this Society will receive. The fact is that the commissioner received in all eight hundred small trees of four hundred varieties—two trees of each sort—and from these small trees has cut the cions to distribute to horticultural and kindred societies all over the northern and western States. So that it is not probable that more than thirty or at most forty of these are sent us, and of these, but one or two cions each. If these are multiplied during the next year, as contemplated in the resolution, we *may* have enough so that each member may get one very short cion each, of quite a number of the sorts. We all have some one or more trees that yield indifferent fruit into which we can graft these cions, but even if they *are* inserted into a few small limbs of valuable trees the damage will *not exceed* a thousand dollars to any one of us.

Dr. HULL—We can dispose of this matter easily. President Flagg has already a large collection of apples which he is testing. Let these cions be entrusted to him to graft and distribute among the members of this Society.

Mr. ELLSWORTH moved the previous question. The motion was sustained and the resolution adopted.

Dr. Hull, L. Ellsworth, and A. M. Brown were nominated and confirmed as the committee provided for by the resolution. This committee, upon a moment's consultation, reported through Dr. Hull that they had selected President W. C. Flagg, of Moro, as the person to receive and propagate the cions, according to the resolution.

The report of the committee was unanimously approved.

The Society, upon motion, adjourned.

WEDNESDAY AFTERNOON.

The Society assembled at the usual hour.

The President called upon Prof. C. V. Riley, State Entomologist, of Missouri, for a paper upon "Snout Beetles injurious to Fruits and Vegetables," that being the regular paper according to published programme. Prof. Riley responded with a paper, of which the following is a copy: The lecture was illustrated with enlarged representations, accurately drawn and colored, of the insects described; also, by living specimens in the "lecture box," which were examined with interest by the members.

SNOUT-BEETLES INJURIOUS TO FRUITS.

BY CHAS. V. RILEY.

INSECTS, like other animals, derive their nourishment from the vegetable and animal kingdoms; but a glance is sufficient to show that they possess a far greater field of operations than all the other animals combined. Indeed, the food of insects is a theme so large that I might occupy your entire time by dwelling upon it alone. The other animals use as food but a very small portion of the inexhaustible treasures of the vegetable kingdom, and the remainder is unpalatable or even poisonous to them. Not so with insects, for, from the gigantic *Banyan* which covers acres with its shade, or the majestic Oak to the invisible fungus, the vegetable creation is one vast banquet, to which they sit down as guests. The larger plant-feeding animals are also generally confined, in their diet, to the leaves, seeds, or stalks, being either foliaceous or farinaceous; but insects make every possible part of a plant yield them valuable provender. We have an excellent illustration of this omnipresent character of insects in those species which are well known to attack the common apple tree. Thus, beginning at the root, we find it rendered knotty and unhealthy on the outside by the common Root-louse, (*Eriosoma pyri*, FITCH,) while the heart is often entirely destroyed by one or the other of two gigantic Root-borers, (*Prionus imbricornis*, LINN., and *P. laticollis*, DRURY.) The trunk is riddled by the larvæ of several Long-horn beetles, and pre-eminently by the Two-striped Saperda, (*Saperda bivittata*, SAY,) as well as by other smaller beetles; the liber and alburnum are destroyed by the Flat-headed Borer, (*Chrysobothris femorata*, FABR.,) the outer bark eaten by bark beetles (*Scolytus* family) and sucked by Bark-lice peculiar to it. The branches and twigs are bored along the center and pruned by the larvæ of the common Pruner (*Elaphidion villosum*, FABR.) and by that of the Parallel Pruner (*E. parallelum*, LEC.,) girdled by the Twig-girdler, (*Oncideres cingulatus*, SAY*,) sawed and rasped by the Periodical Cica-

* I have bred specimens of this insect from apple twigs.

das, (*Cicada septemdecim*, LINN., and *C. tredecim*, RILEY,) otherwise known as Seventeen-year Locusts, by tree-hoppers and a dozen other Homopterous insects; bored into from the side by the Twig-borer (*Bostrichus bicaudatus*, SAY,) wounded by the bites of such beetles as the New York Weevil, (*Ithycerus novæboracensis*, FORSTER,) or pierced as by a red-hot wire by small boring beetles (*Scolytidæ*.)

The buds before they expand are infested with the larvæ of the Apple Bud-moth, (*Grapholitha oculana*, HARR.) or entirely devoured by voracious climbing cut-worms, (*Agrotis scandens*, RILEY, etc.) The blossom has no sooner unfolded its delicate and beautiful petals than it is devoured entire either by the Brazen Blister Beetle (*Lytta æenea*, SAY,) the Striped Cucumber Beetle, (*Diabrotica vittata*, FABR.,) the Rose bug, or by a great many other insects that might be mentioned, some, as the different bees, confining themselves to the pollen or honey from the nectaries, while others again prefer other parts. The young fruit is either eaten partly or entirely by Snapping beetles, (*Melanotus communis* and *M. incertus*) or punctured by either the Plum or the Apple Curculios, and afterwards bored through and through by their larvæ or by the ubiquitous Apple-worm, (*Carpocapsa pomonella*;) as it matures it is eaten into by the larva of the Plum Moth* (*Semasia prunivora*, WALSH,) rendered putrid by the Apple Maggot (*Trypeta pomonella*, WALSH,) and by the Apple Midge, (*Molobrus mali*, FITCH;) as it ripens it is gouged by the Flower Beetles, (*Euryomia inda* and *E. melancholica*,) and disfigured by a variety of other insects, while the skin is often gnawed off and corroded by the larvæ of the Rose Leaf-roller, (*Loxotænia rosaceana*, HARR.;) and even the seed, if it should be preserved, will be attacked by the Grain Silvanus, (*Silvanus surinamensis*, LINN.,) the Dwarf Trogosita, (*T. nana*, MELSH,) and the larvæ of one or two small moths. And, as to the leaves, they are not only sapped and curled by the Apple Plant-louse (*Aphis mali*, FABR,) and by leaf-hoppers; rolled by several leaf-rollers; folded at the edges by a small pale, undescribed worm which I shall soon describe; blistered by the Rosy Hispa, (*Uroplata rosea*, WEBER;) crumpled by the Leaf Crumpler, (*Phycita nebulo*, WALSH,) mined by the Apple Micropteryx, (*Micropteryx pomivorella*, PACK.;) skeletonized and tied together by another undescribed worm, which I shall some day name *Acrobasis Hammondii*, in honor of one of your members—but they are greedily devoured by a whole horde of caterpillars, from the tiny *Micropteryx* to the immense Cecropia Worm, some of which confine themselves to the parenchyma, some to the epidermis, some to the tender parts, without touching the veins, while others bodily devour the whole leaf. The sap forms the sole food of some insects, and even when the poor apple tree dies, a host of different insects revel in its dead and decaying parts, and hasten its dissolution, so that it may the more quickly be resolved into the mold from which it had, while living, derived most of its support, and through which it is to give nourishment for the young trees which are to take its place.

* Inappropriately so-called by Mr. WALSH, as I shall presently show.

Thus we perceive that there is not a single part of the apple tree which is not made to cradle, or to give nourishment to some particular insect, and the same might be said of almost every plant that grows on the face of the earth, even those which produce resinous or gummy substances, or which are pithy in the center, having special insects which feed upon these parts and on nothing else. There are insects—the gall makers for instance—which, not satisfied with any existing part of the plants, as such, cause abnormal growths in which their young are reared.

Nor are insects confined to vegetables in their recent state. The block of hickory wood, fifty years after it is made up into wagon wheels, is as palatable to the Banded Borer, (*Cerasphorus cinctus*, DRURY,) which causes "powder-post," as it was to the Painted Borer, (*Clytus pictus*, DRURY,) while green and growing; and a beam of oak, when it has supported the roof of a building for centuries, is as much to the taste of an *Anobium* as the same tree was while growing, to the American Timber Beetle, (*Hylecœtus Americanus*, HARR.) Some, to use the words of SPENCE, "would sooner feast on the herbarium of Brunfelsius, than on the greenest herbs that grow," and others "to whom

> '———a river and a sea
> Are a dish of tea,
> And a kingdom bread and butter,'

would prefer the geographical treasures of Saxton or Speed, in spite of their ink and alum, to the freshest rind of the flax plant."

Indeed, it would be difficult to mention a substance, whether animal or vegetable, on which insects do not subsist. They revel and grow fat on such innutritious substances as cork, hair, wool, and feathers; and with powers of stomach which the dyspeptic sufferer may envy, will live luxuriously on horn; they insinuate themselves into the dead carcases of their own class; they are at home in the hottest and strongest spices, in the foulest filth, in the most putrid carrion; they can live and thrive upon, or within the living bodies of the larger animals, or of those of their own class; they are at home in the intestinal heat of many large animals, reveling in the horse's stomach, in a bath of chyme of 102 degrees Fahr., or in the bowels of man, in an equally high temperature. Some have even been supposed to feed on minerals, and, not to dwell upon BARCHEWITZ'S tale of East India ants, which eat iron, certain it is, that the larvæ of our May-flies (Ephemeræ) do eat earth, and I have known the larvæ of the common May Beetle to feed for three months upon nothing but pure soil; but in both these cases the insects undoubtedly derive nourishment from the vegetable matter which is extracted from the earth by the action of the stomach.

These facts will serve to show you that, seek where you may, you can not find a place or a substance in which, or on which, some insect does not feed. They people the skyey vast above, swim at ease in the water, and penetrate the solid earth beneath our feet; while some of them inhabit indifferently all three of the elements at different epochs of their lives.

Now when we reflect that there are at least half a million—if not a

full million—distinct species of insects in this sublunary worlds of ours, and that their habits and habitations are so diversified, it would really seem as though entomology was a subject too vast for any one man to shoulder; and indeed it is in all conscience extensive enough. The science of entomology is however so perfect in itself, and its classification is so beautiful and simple that a particular species is referred to its Order, its Family, its Genus, and finally separated from the other species of that genus, with the greatest ease, and with a feeling of true satisfaction and triumph, by those who have mastered the rudiments of the science. And, very fortunately, it is not necessary for the practical fruit grower to enter into the minutiæ of species or even of genera in order to learn the habits of the insects which interest him in one way or another. These minutiæ must be left to the professed entomologist.

There is not an insect on the face of the globe which can not be placed in one or the other of seven, or, more properly speaking, eight great Orders; so that, unlike the Botanist, the Entomologist is not bewildered by an innumerable array of these Orders, though he has five times as many species to deal with. These Orders comprise about two hundred families, many of which may, for practical purposes, be grouped into one family—as, for instance, the seven Families of Digger-wasps, and the five large Families which have all the same habits as the true or genuine Ichneumon-flies. Many more may be neglected as small, rare, or unimportant; so that practically there will remain about a hundred family types to be learned. Each family, as AGASSIZ has well remarked, may, with a little practice, be distinguished at a glance by its general appearance, just as every child, with a little practice, learns to distinguish the Family of A's from the Family of B's, and these from the Family of C's in the alphabet. There is the old English A, the German text A, and a host of ornamental A's, both in the capital letter and the small or "lower case" letter, as the printers call it; but the family likeness runs through them all, and it is astonishing how quick a child learns to distinguish each family type. It is true there are a few abnormal or eccentric insects—there were some which deceived even LINNÆUS—which put on the habit of strange families, just as an eel, which is a true fish with fins, puts on the habit of a snake—a reptile without fins. But these are the exceptions and not the rule.

Now it is wisely ordained that every family, as a general rule, has not only a distinctive family appearance, but also distinct family manners. For example, nobody ever saw an Ichneumon Fly construct a nest and provision it with insects, as does a Digger-wasp; and nobody ever saw a Digger-wasp deposit its eggs in the body of a living insect at large in the woods as an Ichneumon Fly does. But each family maintains its peculiar family habits, and can not be induced to deviate from them.

So universally is this the case, that if you bring me an insect which I never saw in my life, I will tell you half its history at a glance. It is this "Unity of Habits;" this beautiful provision of nature—definite family likeness accompanied by definite family habits—which so simplifies the task of the practical man; for, instead of having to study the diversified

habits of half a million species, he has but to acquaint himself with the appearance and characteristics of one hundred families; and if the rudiments of Entomology had been taught you, gentlemen, at school, so that you had become familiar with these hundred family types, you would now be much better able to cope with your insect enemies. When I think that it would take a child no longer to learn these one hundred family types than it does to learn the one hundred different types which compose the four alphabets—the Roman capital and small alphabet and the writing capital and small alphabet—I fully expect, and sincerely hope, that in the public schools of this country we shall soon have text books introduced which will cover the ground as well, and occupy the same place as do those useful works of LEUNIS, and TROSCHEL & RUTHE, in the public schools of Germany.

With these few remarks, which are intended to show that the practical man may easily obtain a general knowledge of his insect friends and enemies, notwithstanding the wide field of their operations and the immense number of species which exist, we will now dwell for a while on one of these families, which deeply interest you as fruit growers, namely:

THE CURCULIONIDÆ OR SNOUT-BEETLES.

This is one of the very largest and most conspicuous Families in the order of Beetles (*Coleoptera*,) comprising, as it does, over 10,000 distinct and described species. It is at once distinguished from all the other families of beetles by the front of the head being produced into a more or less elongated snout or rostrum, at the extremity of which the mouth is situated. The snout is sometimes very long and as fine as a hair (genus *Balaninus*) and sometimes as broad as the head (genus *Brenthus*;) but it always forms part and parcel of the head and does not articulate on it as does the snout or proboscis of the true Bugs (*Hemiptera*,) or the tongue of Moths and Butterflies. The other chief characteristics of the Family are an apparently four-jointed tarsus or foot (though in reality there are more generally five joints,) an ovoid form narrowing in front, the sides pressed by the convex elytra or wing-covers, the antennæ or feelers attached to the snout, and either elbowed or straight and composed of nine, ten, eleven, or twelve joints—the first of which is always long and the terminal three generally united in a club or knob; and finally stout legs with swollen thighs, sometimes bearing spines.

The larvæ of these snout-beetles are whitish or yellowish and fleshy grubs, always without legs or having only in the place of them fleshy tubercles, which in a measure perform the functions of legs; the body is oblong, with the back generally arched, but sometimes straight. With these characteristics in your mind you can not fail to recognize a snout-beetle when you see one. Now there is hardly one of the one hundred families that I have referred to from which so many injurious species can be enumerated, for with the exception of an European species (*Anthribus varius*) whose larva was found by RATZEBURG to destroy bark-lice, they are all vegetarians, the larvæ inhabiting either the roots,

stems, leaves, or fruits of plants, and the beetles feeding on the same. So whenever you find an insect with the characters just given, you may rest morally certain that it is injurious, and should be destroyed without mercy. This family is not only one of the most injurious, but, on account of the secretive habits of the larvæ, the insects comprising it are the most difficult to control. When a worm is openly and above board denuding our trees, we at least readily become aware of the fact, and can, if we choose, apply the remedy; but when it surreptitiously, and always under cover, gnaws away at the heart of our grains and fruits, we become in a measure helpless to defend ourselves. But even here where the enemy is so well ambushed and hidden, the proper tactics, based on thorough knowledge, will frequently enable us to penetrate the defenses and conquer the foe.

Before leaving this subject of Families, let me impress upon your minds another important fact, namely, that the Family is not peculiar to any one country, and that while species vary, the Family has the same habits and characteristics all over the world. Thus in Europe we find the snout-beetles as injurious, and as difficult to manage—if not more so—than they are in this country. One species, (*Rhynchites conicus*, Hbst.) deposits eggs in the twigs of Pear, Plum, Cherry, and Apricot, and girdles the twig to make it fall; another, (*Rhynchites bacchus*, Schœn,) infests the fruit, and still another, (*Anthonomus pyri*, Schœn,) the flower bud of the Pear. One, (*Rhynchites betuleti*,) rolls up grape leaves and partly cuts their stems, so that they perish, while another, (*Anthonomus pomorum*, Sch.,) infests the blossom bud of the Apple, and renders it unfertile. Still another inhabits the blossom bud of the Cherry. *Balaninus nucum* is found in the common Hazel-nut, and *B. cerasorum* in Cherry pits; *Apion apricans* devours the seed of Clover; *Otiorhynchus sulcatus*, Sch., infests the crown of Strawberries, and two different species, (*Baris chlorizans*, Schœn, and *Ceutorhynchus napi*, Schœn,) infest the stems of cabbages and turnips.

But after all, a single species—the "little Turk," for instance—sometimes causes more loss of fruit in this country than all the above enumerated species do to the European cultivator, and though much of this comparative incapacity for harm, on the part of their insects, may be in a measure due to the better knowledge of his foes, which the transatlantic cultivator possesses, to the more careful culture which he pursues, and the usually limited extent of his orchard, compared with ours; yet it greatly depends on other causes, which the time allowed will not permit me to dwell upon. So I will at once proceed to say a few words about those of our own Snout-beetles, which more particularly interest you.

THE COMMON PLUM CURCULIO.

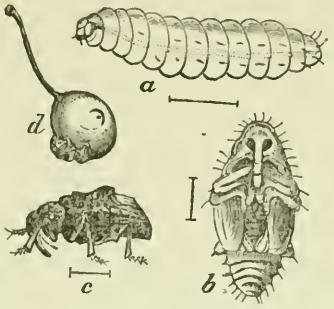
(*Conotrachelus nenuphar*, Herbst.)

IT IS SINGLE-BROODED, AND HIBERNATES AS A BEETLE.

At your last annual meeting, at Ottawa, I read an essay on this insect, giving the established facts in its history, the artificial remedies to

be employed in fighting it; some account of the natural remedies and concluded by referring to such points in its history as were then unsettled, or upon which there were different opinions expressed. It would be needless to repeat any thing that was there said, for any new members, who may not have heard the reading of that essay will find it in the Transactions; so we will confine ourselves to some of the mooted points. I am glad to be able to inform you that I have forever settled the principal question, namely as to its being single or double-brooded.

[FIGURE 1.]



(*a*) larva; (*b*) pupa; (*c*) beetle—all magnified; (*d*) beetle natural size, showing how it punctures fruit.

You will recollect that authors have, from the beginning, held different views on this subject, and this fact should not surprise us when we bear in mind that they reasoned simply from conjecture; nor will it surprise us when we understand the facts in the case.

The facts that fresh and soft Curculios are found in this latitude as early as the beginning of July, and that they still come out of the ground in August, or as late as September and even October, in more northerly latitudes, are well calculated to mislead; while it was difficult to imagine an insect living ten months before ovipositing without its dwindling away through the action of its enemies. But in the beetle state the Curculio has few, if any, enemies, and in my former writings on this subject I have shown that the other facts do not in the least prove the insect to be double-brooded. Among those whose opinions commanded respect, from their profound entomological knowledge and general accuracy, was Mr. Walsh, who, during his last years strenuously contended that this insect was double-brooded. For several years I have entertained a different opinion, believing that it was single-brooded as a rule and only exceptionally double-brooded; and the facts so fully bear me out in this opinion, that, were my late associate here with us, to-day, I should bring forth the testimony with a feeling of triumph, for he was not often in the wrong! It is worthy of remark, however, that Mr. Walsh's first impression, as given by him in the year 1867,* was that

* *Practical Entomologist*, vol. I, No. 7.

this insect is single-brooded; his first opinion thus coinciding with what I have now proved to be the facts in the case.

In the First Missouri Entomological Report, I have reviewed the experiments which led him to change his opinion, and have shown that they did not warrant his final conclusion.

The many words that have been penned in the discussion of this question would fill a volume; but one stern fact, one thorough experiment, is worth more than all the theories that were ever conceived, or the phrases that were ever written on the subject.

At first it seems to be a very simple question to settle, but the fact that it remained unsettled so long would indicate the reverse. One of your worthy ex-presidents, Judge A. M. Brown of Villa Ridge, at my suggestion endeavored, in the summer of 1869, to solve the problem by imprisoning the first bred beetles and furnishing them with plucked fruit. Dr. Hull partially performed a like experiment, and I did the same myself; but we were met by the advocates of the double-brooded theory with the objection that such a test was of no value, as the curculio would not deposit on plucked fruit, or in confinement; and to add weight to their argument they would cite us to numerous instances among butterflies to prove that many insects really will not deposit in confinement. But, as we shall see, they placed too much confidence in the instinct of Mrs. Turk when, from such premises, they made these deductions apply to her. As I proved over and over again, the question could not be solved, with any more certainty, by confining beetles to living boughs containing fruit, as the boughs could not well be covered with any substance through which the beetles would not gnaw their way out. So I determined last spring to build a frame over a large tree and entirely enclose it in stout gauze that would neither let a flea in or out; much less a curculio. Having accomplished this before the blossoms had fallen off the tree, I awaited with pleasurable interest the result from day to day, from week to week, and from month to month, engaging a competent person to watch when, from necessity, I was obliged to be away. It were worse than waste of time to detail here the many interesting observations made on this tree which I had under control, or to enumerate the many other experiments which I conducted in other ways, or the innumerable facts obtained; and it will suffice to give in a summary manner the results, premising only that every precaution was taken, and no expense spared, to prevent failure; that the experiments were satisfactory beyond my expectations, the results conclusive beyond all peradventure, and that I can prove every statement I make. To sum up then: *The Plum Curculio is single-brooded*, and I have with me a number alive and kicking *which were bred during the latter part of June from the first stung peaches.* [These beetles, warmed by the artificial temperature of the hall, were quite active, and were feeding ravenously on a piece of apple which I had placed in the bottle.] But, as there seem to be exceptions to all rules, so there are to this; yet the exceptions are only just about sufficient to prove the rule, for as far south as St. Louis, not more than one per cent. of the beetles lay any eggs at

all, until they have lived through one winter; or, in other words, where one female will pair and deposit a few eggs the same summer she was bred, ninety-nine will live on for nearly ten months and not deposit till the following spring. In more northern latitudes I doubt if any exceptions to the rule will be found.

As to the other mooted point, namely, whether this insect ever hibernates under ground in the larva state, I am perfectly satisfied that it never does, but that it passes the winter invariably as a beetle under all sorts of shelter in the woods; generally however, near the surface of the ground. Indeed it often makes for itself a hole in the ground, seldom however deeper than its own body. In short, there is very little to alter or modify in the established facts in its natural history which I gave you last year. The egg instead of being "oval" as there stated, would be better described as "oblong-oval," measuring exactly 0.03 inch in length and being nearly three times as long as wide. It should also be remarked here that when depositing her eggs in apples the female often neglects the usual symbol of Mohammedanism which she so invariably inscribes on stone fruit; and that where this mark is made on apples, it more easily becomes obliterated.

During their beetle life these insects feed continually just as long as the weather is mild enough to make them active. While fruit lasts they gouge holes in it, and after peaches have gone, apples are badly attacked. They also gnaw large holes in the leaves, and when nothing else presents, will feed on the bark of the tender twigs.

Let us be thankful, therefore, that there can no longer reasonably be difference of opinion, or discussion on these questions which, though of no very great practical importance were yet of great interest to us all.

IT IS NOCTURNAL RATHER THAN DIURNAL.

Before leaving this little Turk however, I have some other facts to mention which were first brought to light the present year, and which have a most important practical bearing. You have been repeatedly told and you no doubt have all come to believe it, that curculios fly only during the heat of the day, and that it is useless to endeavor to catch them after, say, ten o'clock in the morning. Well, gentlemen what I am about to utter will no doubt astonish you, but I know whereof I speak. *The Curculio is a nocturnal rather than a diurnal insect; is far more active at night than at day, and flies readily at night, into the bargain.* If any one doubts this assertion, let him go into his peach or plum orchard at midnight with a lantern and sheet, and he will catch more than he could during the day, and will also find, to his sorrow, that they are then much more nimble and much bolder—scarcely feigning death at all. Indeed, with the exception of such females as are busily occupied in depositing eggs, most of the Curculios rest during the day, sheltered either by the foliage or branches of the tree, or by any extraneous substance on the ground near by. They are also more active in the evening than in the morning, and these facts lead us to the important question, whether the morning or the evening is the best time to jar the trees. My experi-

ments so far are not conclusive, for I have some days caught more in the morning, and at others more in the evening. All other things being equal, the evening will prove preferable to the morning, from there being less dew at that time; and I particularly draw your attention to this matter now, that you may institute the proper experiments during the coming year.

THE RANSOM CHIP-TRAP PROCESS.

Another grand and successful mode of fighting the little Turk was also brought to light again, and to a great extent practiced the past summer. I allude to the Ransom chip-process for entrapping this insect. About the middle of May the horticultural world was startled by a somewhat sensational article which was the burden of an extra to the *St. Joseph* (Mich.) *Herald*, headed "Great Discovery—Curculio Extermination Possible." The process consists in laying close around the butt of the tree, pieces of chips or bark under which, according to their instinct, a great many of the Curculios secrete themselves during the day and may thus be easily destroyed. Now that we better understand this insect's habits we also better comprehend the philosophy of this process. Being nocturnal in their habits, the beetles naturally seek shelter during the day, and especially is this the case early in the season when the days are chilly and before the females are too much engaged in egg depositing. You are perhaps all familiar with the numerous opinions expressed as to the value and efficiency of this method; but I will here repeat my own as given to the readers of the *American Entomologist and Botanist*, first, because I endeavored to be candid and truthful, and secondly, because the opinions expressed have been so fully corroborated by subsequent experience.

"We are really sorry to damp the ardor and enthusiasm of any person or persons, when enlisted in such a good cause, but truth obliges us to do so nevertheless. Of course, Curculio extermination is possible! but not by the above method alone, as our Michigan friends will find to their sorrow. For a short time, early in the season, when the days are sometimes warm and the nights cold, and before the peach blossoms have withered away, we have succeeded in capturing Curculios under chips of wood and other such sheltered situations; but we have never been able to do so after the fruit was as large as a hazel-nut, and the Little Turk had got fairly to work. Our Michigan friends will, we fear, find this to be too truly the case.

"This process, furthermore, can not well be called a discovery, because it was discovered several years ago, as the following item from *Moore's Rural New Yorker*, of January 28th, 1865, will show:

How to Catch Curculio.—In May last we had occasion to use some lumber. It was laid down in the vicinity of the plum-yard, and on taking up a piece of it one cold morning, we discovered a number of Curculios huddled together on the under side. On examining other boards we found more; so we spread it out to see if we could catch more, and we continued to find more or less every day, for two weeks. We caught in all one hundred and sixty-one. So I think if people would take a little pains they might destroy a great many such pests. These were

caught before the plum trees were in flower. What is most singular is, that we never found a Curculio on a piece of old lumber, although we put several pieces down to try them. They seemed to come out of the ground, as we could find them several times a day by turning over the boards.

JOHNSONVILLE, N. Y. MRS. H. WIER.

"But though Mr. Ransom can not properly claim to have made a new discovery, and though this mode of fighting will not prove sufficient to EXTERMINATE the Curculio, yet we greatly admire the earnestness and perseverence which he has exhibited. In demonstrating that so great a number of the little pests can be entrapped in the manner described, Mr. R. has laid the fruit-growers of the country under lasting obligations to him. It is a grand movement towards the defeat of the foe, and one which, from its simplicity, should be universally adopted early in the season. But we must not relinquish the other methods of jarring during the summer, and of destroying the fallen fruit; for we repeat, that the Plum Curculio will breed in the forest.

"I subsequently visited St. Joseph for the express purpose of examining more closely into Mr. Ransom's Curculio remedy. I found that so few Curculios had been caught under the chips after the first week in June, that nearly everybody, except Mr. Ransom, had for some time abandoned the method and were jarring their trees by one process or another.

"Mr. Ransom himself, by dint of unusual perseverance and great care in setting his traps, has had much better success than I had expected he would. On the 15th June he caught 78; on the 16th, 97, and on the 17th, 71. For about a week after this, he scarcely caught any, but from the 24th to the 27th inclusive, he caught about 300. On the 6th of July I accompanied him around the outside rows of his orchard and caught five under the traps. We had no opportunity to use the sheet, but I am satisfied that more could have been jarred down. Mr. R. had a very fair crop of peaches, and—forgetting that crops have often been grown before with very little care, and that others around him who did not bug so persistently had fruit also this year—is very sanguine of his new method, and too much inclined, perhaps, to attribute his crop solely to this remedy. Nevertheless, contrary to the impressions made by his published views, he was candid enough to admit that it might be found necessary to resort to the jarring process, after a certain season of the year; and indeed the number of stung peaches on the ground showed too plainly that there is no hope of EXTERMINATION by the chip plan alone. The soil around St. Joseph is, for the most part, a light sandy loam, never packing, and very easily kept in good cultivation. To this character of the soil must be attributed much of the success with the Ransom method; for I am satisfied, after full experiment, that in the warmer climate and heavier soil of St. Louis, it is of no practical use after the middle of May, or at the farthest, after the first of June. The few specimens that I have captured by this method at St. Louis, were found under small pieces of new shingle; and Mr. W. T. Durry, who has 2300 trees in his orchard at St. Joe., also found this the best kind of trap. Mr. Ransom, however,

prefers small pieces of oak-bark, which he places close around the tree with the inner or concave side pressed to the ground. Stones do not answer well, and corn-cobs are objectionable because it requires so much time to discover and destroy the Curculios, which hide in their deep cavities."

The best time of day to take them from under the chips is undoubtedly in the afternoon; but it must not be left too long, as they begin to leave and scatter over the trees as soon as the sun approaches the horizon. The chips should be laid around the trees as soon as the frost is out of the ground, for more beetles will be caught under them during a few weeks thus early in the season than throughout the rest of the year.

KEEPING IT IN CHECK BY THE OFFER OF PREMIUMS.

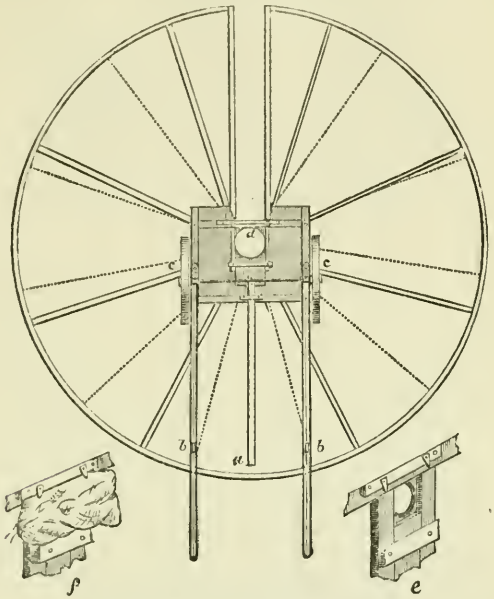
After visiting St. Joseph and vicinity, I passed into Ontario, where I found the trees overloaded with fine unblemished fruit. I found my friend, Mr. Wm. Saunders, of London, also much occupied with, and interested in, the Curculio question. He was, in fact, carefully counting different lots of this insect which had been received from different parts of the Dominion; for be it known, that the enterprising Fruit-Growers' Association of Ontario, in its praise-worthy efforts to check the increase of the Curculio, offered *a cent per head* for every one which should be sent to our friend, who happens to be secretary of that body. What would you think, gentlemen, if the Legislature of Illinois, or if this Society should offer an equally liberal premium *per capita* for every little Turk captured? Wouldn't you set about capturing them in earnest, though! The Legislature might stand it, and I am not sure but that some such inducement, held out by the State to its fruit-growing citizens, would pay, and prove the most effective way of subduing the enemy. But the Horticultural Society that should undertake it, would have to be pretty liberally endowed. Just think of it; ye who catch from three to five thousand per day! The bugs would pay a good deal better than the peaches. However, very fortunately for the Ontario Fruit-Growers' Association, their good offer did not get noised abroad as much as it might have been, and the little Turk occurs in such comparatively small numbers, that up to the time I left, only 10,731 had been received.

JARRING BY MACHINERY.

Of course there is no more expeditious way of jarring down the Curculio than by the Hull Curculio-catcher. Yet I confess that after extensive observations in many different parts of the country I am forced to the conclusion that this machine does not give the satisfaction one could wish. In my paper last year I showed that where it was constantly used the trees suffered serious injury from bruising, and it is a rather significant fact that in most orchards where it has been introduced, some modification has soon followed, or else it has been entirely abandoned; while in the East they still adhere to the improved stretchers, and mallet. It seems to me that the machine, as made by your State Horticulturist two years ago, was not only too heavy and unwieldy, but incapable of giving the requisite sharp jarring rap to the branches of a

large tree without causing too much injury to the trunk, and that if a modification of it could be made to satisfy the peach-grower, there would soon be a greater demand for such a machine.

[FIGURE 2.]

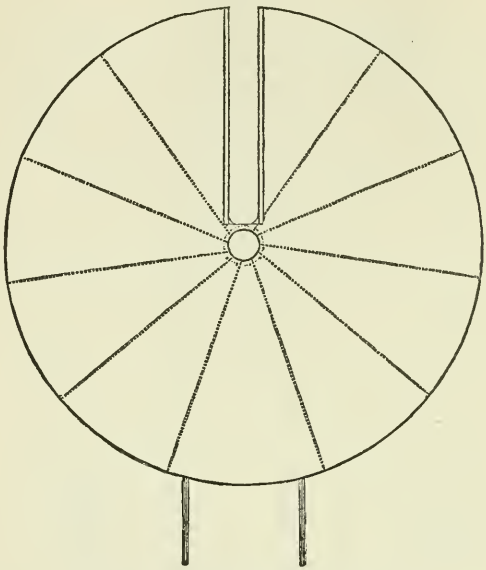


Back view of Ward's Curculio-catcher.

As a step in the right direction I will briefly describe a machine which I have herewith illustrated, and which I found in quite general use around St. Joseph and Benton Harbor, Mich. It was gotten up by L. M. Ward of the latter place, and proves, in the orchard, to have decided advantage over the Hull machine, of which it is a modification. It is a much lighter machine, and, as the diagrams indicate, instead of running on a single wheel it is carried and balanced by two, (Fig. 2, *c c*) and supported with legs on the handles, (Fig. 2, *b b*), when not running. The Curculios and stung fruit are brushed through a hole in the centre (Fig. 2, *d*), and as the operator passes from one tree to another he closes this hole, to prevent the beetles from escaping, by means of a slide (Fig. 2, *a*) which he has under control. Bags previously prepared, by being fastened on a square piece of wood with a hole in the centre corresponding to a hole in the side of the bag, are snugly buttoned below (Fig. 2, *e* and *f*) so as to secure everything that falls through from above, and when one bag is full it is easily replaced by another and its contents destroyed by scalding, or otherwise, and emptied out. In most of the orchards where this machine was being used the jarring was performed by a separate mallet, which is easily hung, as is also the brush, on the

shafts when the machine is being operated by one person; or, which I think a better way, where help is not scarce, it can, with the brush, be carried by a second person (an intelligent boy will answer) who performs the jarring and brushing while the first person wheels the machine.

[FIGURE 3.]

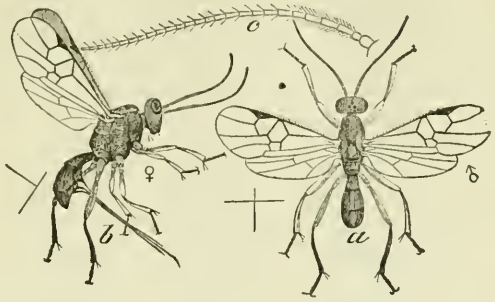


Front view of Ward's Curculio-catcher.

The machine is simple in construction and any one with ordinary mechanical ability can build it; modifying, of course, the diameter of the wheels and the inclination of the sheet to suit the character of his trees or of his ground. Mr. Ward has taken no patent out for it and the machine is, therefore, public property. It has been argued in favor of the one-wheel machine that it can be more easily run on rough ground and more readily turned, which in a great measure is true; but the Ward machine is so light that it can easily be tilted on one wheel in turning, and our Benton Harbor friends have so far found no difficulty in operating it. Either machine can be used with a bumper, or with a mallet, and there are certain rules which should be adopted in jarring for the Curculio, no matter whether a one-wheel or a two-wheel machine is used. These rules are: first, in jarring with a mallet it is best to prepare each tree by squarely sawing off some particular limb, or else the mallet must be well protected with rubber to prevent bruising of the tender bark. The former custom is by far the best as we are enabled to give the tree a sharp vibrating rap with the bare hard wood. Secondly, if the mallet is dispensed with and the tree is bumped with the machine—a method which certainly has the advantage of expedition—it will be found altogether

more profitable to drive a shouldered spike in the trunk at the right distance from the ground, and the jarring can then always be done on this spike without injury to the tree.

[FIGURE 4.]



Sigalphus Curculio Parasite: (*a*) male; (*b*) female; (*c*) antenna.

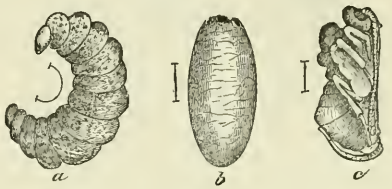
TWO TRUE PARASITES OF THE PLUM CURCULIO.

Just 10 years ago, in his "Address on the Curculio," delivered at the annual meeting of the N. Y. State Agricultural Society, Dr. Fitch gave an account, accompanied with a figure, of a small Ichneumon-fly which he named *Sigalphus curculionis*, and which he believed was parasitic on the Curculio. Before that time no parasite had ever been known to attack this pestilent little weevil, and even up to the present time it is currently believed that no such parasite exists; for unfortunately the evidence given by Dr. Fitch was not sufficient to satisfy some of our most eminent entomologists. These parasites were in fact received by him from Mr. D. W. Beadle of St. Catherines, C. W., who had bred them from Black-knot, from which he bred at the same time a certain number of Curculios; but as other worms besides those of the Curculio are likewise found in Black-knot, we had no absolute proof that this fly was parasitic on the insect in question. Consequently we find that our late Walsh, in his Report as Acting State Entomologist, rather ridicules the idea of its being a Curculio parasite and endeavors to prove that it is parasitic instead on the larva of his Plum Moth (*Semasia prunivora*). But I have this year not only proved that poor Walsh was himself wrong in this particular inference, but that he was equally wrong in supposing his little Plum-moth, so called, to be confined to plums; for I have bred it from Galls (*Quercus frondonsa* Bassett); from haws, from crab apples and abundantly from tame apples.

To be brief, Dr. Fitch's *Sigalphus* is a true parasite on the Plum Curculio and I have bred hundreds of the flies from Curculio larvæ. The first bred specimens gave me much pleasure, for as soon as I saw they belonged to the same genus as Dr. Fitch's fly, I felt assured that another disputed question was settled. But to make assurance doubly sure, I repeatedly half filled large jars with pure earth, finely sifted so that no living animal remained in it. Into these jars I placed Curculio larvæ

from day to day as they issued from peaches that were thrown into another vessel, and in due time the parasitic flies began to issue from the ground along with the perfect Curculios. Nay more than this, I soon learned to distinguish such Curculio larvæ as were parasitised, and after they had worried themselves under the ground—seldom more than half an inch—I would uncover them, and on several occasions had the satisfaction of watching the gnawing worm within reduce its victim until finally nothing was left of him.* As soon as the Curculio larva is de-

[FIGURE 5.]



Sigalphus Curculio Parasite: (*a*) larva; (*b*) cocoon; (*c*) pupa.

stroyed by the parasite, the latter (Fig. 5, *a*) encloses itself in a tough little yellowish cocoon of silk (Fig. 5, *b*), then gradually assumes the pupa state (Fig. 5, *c*) and at the end of about the same length of time that the Curculio requires to undergo *its* transformations and issue as a beetle, this, its deadly foe, gnaws a hole through its cocoon and issues to the light of day as a black four-winged fly (Fig. 4, *a*, *male; b*, *female*). In the vicinity of St. Louis, this fly was so common the past season that, after very careful estimates, I am satisfied three-fourths of all the more early developed Curculio larvæ were destroyed by it. On the 17th and 18th of April, in that locality a severe frost killed the peach buds on all but a few of the young and most vigorous trees of Hale's Early and Crawford, so that instead of a large and abundant crop of peaches to depredate on, the little Turk had to concentrate its attacks on the few peaches that were left; and no one expected that any fruit would be saved. Yet the work of this little parasite was so effectual that, wherever fruit set, a fair crop was gathered even by those who made no effort at all to protect their trees!

While visiting Dr. Fitch last August, at his house in Salem, N. Y., I compared my bred specimens with his species, and found them identically the same; but I shall, in this reading, omit the description which follows and which may be read, by those interested, when this essay is published.

As Mr. Walsh bred this same pararsite from the larvæ of his little Plum Moth, it doubtless attacks other soft-bodied larvæ and does not confine itself to the Plum Curculio. This is the more likely as it would scarcely pass the winter in the fly state. The female, with that wonderful instinct which is exhibited in such a surpassing degree in the insect world, knows as well as we great Lords of Creation what the little crescent mark upon a peach or plum indicates; and can doubtless tell with more surety, though she never received a lesson from her parents, whether or not a

Curculio larva is drilling its way through the fruit. When she has once ascertained the presence of such a larva by aid of her antennæ—which she deftly applies to different parts of the fruit, and which doubtless possess some occult and delicate sense of perception which, with our comparatively dull senses, we are unable to comprehend—then she pierces the fruit, and with unerring precision, deposits a single egg in her victim, by means of her ovipositor.

Now there is, as I shall show in the description, a variety (*fusca*) of this parasite with the ovipositor nearly one-fifth of an inch long, but in the normal form the ovipositor is only twelve-hundreths of an inch long, and the Curculio larva must therefore be reached soon after it hatches or while yet very young. Consequently we find that the earliest Curculio larvæ, or those which hatch while the fruit is yet small, are the most subject to be parasitised, and while from larva obtained early in the season, I bred more parasites than Curculios, this order of things was reversed a little later in the year. Some persons will no doubt wonder how such a large fly can be developed from a Curculio larva which is stung while so young; but we do not know how long the parasitic egg remains unhatched, and it must be remembered that it is a rule, wisely ordained and long known to exist in insect life, that the parasitic larva does not at first kill outright, but subsists, without retarding growth, upon the fatty portions of its victim, until its own growth is attained. Thus the first worm derives its nourishment from the jucy fruit, and grows on regardless of the parasite which is consuming its adipose substance, until the latter is sufficientiy developed, and the appointed time arrives for it to destroy its prey by attacking those parts more vital.

This parasite which I will now proceed to describe, belongs to the second sub-family (*Braconides*) of the Ichneumon-flies (*Ichneumonidæ*), and the venation of its wings, and 3-jointed abdomen place it in the genus *Sigalphus*. Westwood (Synopsis p. 63) gives three cubital panes or areolets in the front wing as characteristic of the genus; but Brullé (p. 510) and, as Mr. Cresson informs me, Westmael in his *Braconides de Belgique* give only two, which is the number in our insect.

Sigalphus curculionis, Fitch—*Imago*—(Fig. 4, *a* male; *b* female) *Head* black, sub-polished and sparsely covered on the face with short whitish hairs; ocelli touching each other; labrum and jaws brown; palpi pale yellow: antennæ (Fig. 4, *c*) 27-jointed, filiform, reaching when turned back to middle joint of abdomen or beyond, the bulbus and small second joint rufous and glabrous, the rest black or dark brown though 3–10 in many specimens are more or less tinged with rufous; 3–14 very gradually diminishing in size; 14–27 sub-equal. *Thorax* black, polished, the metathorax distinctly and broadly punctate and the rest more or less distinctly punctate or rugose, with the sides sparsely pubescent. *Abdomen* pitchy-black, flattened, the dorsum convex, the venter concave, and the sides narrow-edged and slightly carinated; the three joints distinctly separated and of about equal length; the first joint having two dorsal longitudinal carinæ down the middle; all densely marked with very fine longitudinal impressed lines, and sparsely pubescent: (Dr. Fitch in his description published in the *Country Gentleman*, under date of September 1859, states that these lines leave "a smooth stripe along the middle of its second segment and a large smooth space on the base of the third:" which is true of a few specimens, but not of the majority, in which the impressed

lines generally cover the whole abdomen.) Ovipositor longer than abdomen, but when stretched in a line with it, projecting backwards about the same length beyond; rufous, with the sheaths black. *Legs* pale rufous with the upper part of hind tibiæ and tarsi, and sometimes the hind femora, dusky. *Wings* subhyaline and iridescent, the veins pale rufous and the stigma black. Length female 0.15–0.16 inch, expanse 0.30; male differs only in his somewhat smaller size and in lacking the ovipositor. In many specimens the mesothorax and the eyes are more or less distinctly rufous.

Described from 50 females, 10 males bred June 23d—July 29th 1870 from larvæ of *Conotrachelus nenuphar*, and 2 females obtained from Dr. Fitch.

Larva, (Fig. 5, *a*)—white with translucent yellowish mottlings.

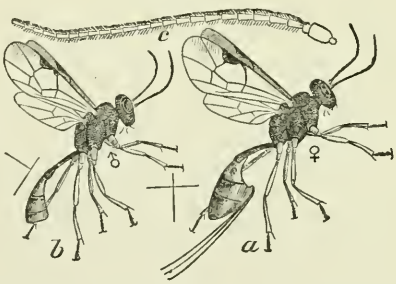
Pupa, (Fig. 5, *c*)—Female—0.17 inch long; whitish, the members all distinct, the antennæ touching hind tarsi, the ovipositor curved round behind, reaching and touching with its tip the third abdominal joint, which afterwards forms the apical joint of imago; five ventral joints, which in the imago become much absorbed and hidden, being strongly developed.

Cocoon, (Fig. 5, *b*)—Composed of one layer of closely woven yellowish silk.

VARIETY RUFUS—Head, thorax and most of first abdominal joint entirely rufous, with the middle and hind tibiæ dusky, and the ovipositor three times as long as abdomen and projecting more than twice its length beyond its tip.

Described from three females bred promiscuously with the others. This variety is slightly larger and differs so remarkably from the normal form that, were it not for the absolute correspondence in all the sculpturing of the thorax and body, and in the venation of the wings, it might be considered distinct. The greater length of the ovipositor is very characteristic and accompanies the other variations in all three of the specimens.

[FIGURE 6.]



Porizon Curculio Parasite: (*a*) female; (*b*) male; (*c*) antenna.

The other parasite works in very much the same manner but instead of issuing the same summer as a fly, it remains in its somewhat tougher and more yellowish cocoon all through the fall and winter, and does not issue in the winged state till the following spring. This parasite was first discovered by Dr. Trimble who sent me the cocoons from which I subsequently bred the perfect fly. It belongs to the first sub-family (*Ichneumonides*) of the Ichneumon–flies and apparently to the genus *Porizon** of which it forms a new species. But I shall here also, in this

* As I am informed by Mr. E. T. Cresson of Philadelphia, who pays especial attention to the classification of the ICHNEUMONIDÆ, it might more properly be referred to Holmgreu's genus *Thersilochus* which differs from *Porizon* in the greater distance between the antennæ at base, and in the venation of the wing.

reading, omit the technical description which follows, and will only state that it differs from the other species in its reddish-brown abdomen, as well as in form, as may be readily seen by referring to the figures (Fig. 6, *a* female; *b* male; *c* antenna).

PORIZON CONOTRACHELI, N. Sp. *Head* pitchy-black, opaque, the ocelli triangularly placed and close together; eyes oval, polished, and black; face covered with a silvery-white pubescence; labrum rufous, with yellowish hairs; mandibles and palpi pale yellowish-brown; antennæ inserted in depressions between the eyes, reaching to metathorax when turned back, filiform, 24-jointed; black with basal joints 6—1 becoming more and more rufous, the bulbus always distinctly rufous; bulbus rather longer and twice as thick as joint 3; joint 2 about one-third as long. *Thorax* pitchy-black, opaque, the sides slightly pubescent with whitish hairs, the mesothorax rounded and bulging anteriorly, the scutellum slightly excavated and sharply defined by a carina each side; metathorax with the elevated lines well defined and running parallel and close together from scutellum to about one-fourth their length, then suddenly diverging and each forking about the middle. *Abdomen* glabrous, polished, very slender at base, gradually broader and much compressed from the sides at the apex which is truncated; peduncle uniform in diameter and as long as joints 2 and 3 together; joints 2—5 subequal in length; color rufous with the peduncle wholly, dorsum of joint 2, a lateral shade on joint 3, and more or less of the two apical joints superiorly, especially at their anterior edges, black; venter more yellowish: ovipositor about as long as abdomen, porrect when in use, curved upwards when at rest, rufous, with the sheaths longer and black. *Legs*, including trochanters and coxæ uniformly pale yellowish-brown with the tips of tarsi dusky. *Wings* subhyaline and iridescent, with veins and stigma dark brown, the stigma quite large, and the two discoidal cells subequal and, as usual in this genus, joining end to end, but with the upper veins which separate them from the radial cell, slightly elbowed instead of being straight, thus giving the radial cell a quadrangular rather than a triangular appearance. Male differs from female only in his somewhat smaller size and unarmed abdomen. Expanse female 0.32 inch, length of body exclusive of ovipositor 0.22; expanse male 0.28, length 0.18.

Described from 3 females, 1 male bred May 26th—28th, 1870, from cocoons received from Dr. I. P. Trimble, and 1 female subsequently received from the same gentleman—all obtained from larvæ of *Conotrachelus nenuphar*.

"But of what use are these parasites?" say you! Well, they can not, it is true, be turned to very great practical account, because they are not sufficiently under our control; but it is a source of great satisfaction to those who have been looking for many years for some natural aid to help them in the artificial warfare waged against the Curculio, to know that besides its several cannibal foes, there are at last two true parasites which attack it. Indeed with the knowledge of the Curculio-enemies figured and described two years ago in the *American Entomologist*, and of the egg-destroying *Thrips* which I described to you last year, and these two parasites, the grower of our luscious stone-fruits may with good reason begin to hope for better days, for the prospect brightens. There is no philosophy in the statement of Mr. Ransom,* that we can never hope for assistance from parasites, because, as he confidently expresses it, "there are none at present but what have always existed!" Such argument will do for the believers in the old-school doctrine, that every thing was created just as we find it; but not for those who rightly comprehend the

* *Prairie Farmer*, June 4th, 1870.

Darwinian hypothesis of development, and who believe that life is slowly undergoing change and modification to-day just as it ever has since it had an existence on this Earth. For my own part, nothing has ever appeared more absurd than the direct creation of something out of nothing, and I would as soon believe that we all dropped full grown from the clouds, just as we are here to-day—instead of being brought into the world by natural means and gradually developing into manhood and womanhood—or that we have the same habits as our barbarous ancestors had, as to believe that the animal life about us is now as it was in the beginning! Therefore, though these Curculio parasites may have existed in this country long ere the white man first beheld its shores, yet they may only have acquired the habit of preying upon the Curculio within the last comparatively few years. Moreover, much benefit may be derived from their artificial propagation and dissemination, and—utopian as the scheme may appear to you—I intend next year, *Deo volente*, to breed enough of the first mentioned species to send at least a dozen to every county seat in Missouri, and have them liberated into some one's peach orchard. By this means I hope to spread them all over the State, and if in future years you Suckers should find that our peach growers are, by its aid, able to get a fair crop of peaches every year while yours are constantly destroyed by Mrs. Turk, our State Government may condescend to send across the Mississippi a few thousand pairs of the little *Sigalphus* for the trifling consideration of $1.00 per pair! If the money derived from this new branch of industry should be safely set aside in the vaults at Jefferson City, until sufficient has accumulated to erect in St. Louis a fire-proof building for a museum of Natural History, and Agricultural and Geological rooms, there would be at least as much prospect of getting such a building as there seems to be now!

THE APPLE CURCULIO.

(*Anthonomus quadrigibbus*, Say.)

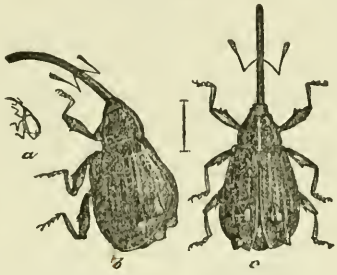
"Prove all things; hold fast that which is good!"

This injunction of St. Paul applies with just as much force to us to-day, as it did in centuries past to the Thessalonians. In what has been said above about the Plum Curculio we have had abundant opportunity of testing the soundness of the old proverb, and in ascertaining the history of the Apple Curculio, which I am about to give you, it was very necessary to bear the advice in mind. It often takes years to undo the assertions of men who are in the habit of talking glibly of that which they really know nothing about, and I ought to comment severely on what has been said about this insect; but I refrain from doing so, in this case, lest it be said that my words are prompted from personal considerations. I shall therefore content myself with a plain narrative of this insect's habits.

First then, let us explain the differences between the perfect states of this insect and the Plum Curculio, that any one of you may distinguish between them.

The snout of the Plum Curculio hangs down like the trunk of an elephant; it is short, stout, and does not admit of being stretched out horizontally forwards; and as may be seen by referring to the figure (Fig. 1, *c*) is scarcely as long as the head and thorax together, and can be folded back between the legs, where there is a groove to receive it. The Plum Curculio is broadest across the shoulders and narrows behind, and moreover, the black sealing-wax-like, knife-edged elevations on the back, with the pale band behind them, characterize it at once from all our other fruit-boring snout-beetles.

[FIGURE 7.]



Apple Curculio—(*a*) natural size; (*b*) side view; (*c*) back view.

The Apple, or Four-humped Curculio (Fig. 7) is a smaller insect, with a snout which sticks out more or less horizontally and can not be folded under, and which in the male is about half as long, and in the female is fully as long as the whole body. This insect has narrow shoulders and broadens behind, where it is furnished with four very conspicuous humps, from which it takes its name. It has neither the polished black elevations nor the pale band of the Plum Curculio. In short, it differs generically and never attacks stone fruit.

The size varies, as you will see from the specimens in the lecturing box, from less than 1-20th to nearly 1-12th of an inch, but the colors are quite uniform, the body being ferruginous or rusty-brown, often with the thorax and anterior third of the wing-covers ash-gray—the thorax having three more or less distinct pale lines.

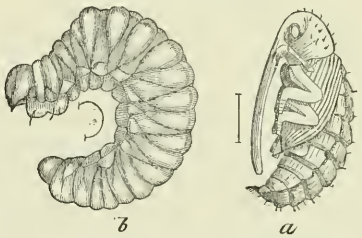
ITS NATURAL HISTORY.

This beetle, like the Plum-weevil is a native American insect, and has from time immemorial fed on, and bred in, our wild crabs. It eventually learned to like our cultivated apples and pears, and is also found on quinces. At present it does considerable damage to the crop in some localities, though it yet prefers the wild to the cultivated fruit. Like the Plum-weevil also, it is single-brooded, and winters over in the beetle state, though I was led to believe differently a year ago. With its long thin snout it drills holes into the fruit, much resembling the puncture of a hot needle, the hole being round, with a more or less intense black annulation, and an ash-gray centre. Those holes made for food

are about one-tenth of an inch deep and generally scooped out broadly at the bottom in the shape of a gourd. Those which the female makes for her eggs are scooped out still more broadly and the egg at the bottom is often found larger than the puncture at the orifice—thus indicating that it swells from absorption, by a sort of endosmosis, of nutritive fluid from the surrounding fruit, just as the eggs of many saw-flies and of some other snout-beetles are known to do.

The egg is fully 0.04 of an inch long, nearly oval, not quite three times as long as wide, and of a yellowish color with one end dark and empty when the embryo larva is well formed. The egg-shell is so very fine that the larva seems to gradually develop from it instead of crawling out of it; and by taking a matured egg and gently rolling it between the thumb and finger, the young larva presents itself, and at this early age its two little light brown mandibles show distinctly on the head. As soon as this larva hatches it generally goes right to the heart of the fruit and it feeds there around the core, producing much rust-red excrement, and acquiring a tint of the same color. It feeds for nearly a month, and when full grown presents the appearance of Figure 8, *b*.

[Figure 8.]



Apple Curculio ¾(*a*) pupa; (*b*) larva.

It differs so remarkably from that of the Plum Curculio that the two insects can be distinguished at a glance even in this masked form. It is softer, the chitinous covering being thinner and much whiter. It can not stretch straight and travel fast as can that of the Plum Curculio, but curls round with an arched back, joints 4—7 being larger than the preceeding. It is more crinkled, each joint being divided into three principal folds much as in the common White Grub. The space between the folds is frequently bluish-black, and there is a very distinct, continuous, vascular, dorsal line of a bluish color. It has no bristles like *nenuphar* except a few weak ones on the first joint, arising from some ventral tubercles which remind one of feet. The head is yellowish-brown with the jaws somewhat darker, and the breathing pores, except that in fold of first joint, are not easily seen.

IT TRANSFORMS IN THE FRUIT.

The fruit of the wild crab containing this larva never falls, and the fruit of our cultivated apples seldom; and in this respect the effect of its

work differs remarkably from that of the Plum Curculio, or even of the Codling Moth. Why such is the case it would be difficult to explain! It is one of those incomprehensible facts which at every turn confront the student of Nature's works. We might with equal reason ask why it is that of the two stone fruits, the plum and the cherry, the larger falls and perishes and the smaller hangs on and lives, when infested with the Plum Curculio; and of the two pomaceous fruits, the apple and the haw, the larger likewise falls and perishes and the smaller hangs on and lives, when infested with similar larvæ? Most persons would naturally infer that the larger instead of the smaller fruits would best resist the injurious gnawings of the worm within; and though we may explain away the paradox by supposing that the longer stem of the smaller fruits prevents the injury from reaching its juncture with the branch, so readily as it does through the shorter stem of the larger fruits; or that the greater weight of the larger fruit causes it to fall so readily; yet this is only assuming, and I doubt whether the vegetable pathologist will ever be able to show the peculiarities of the fruits which cause the different effects.

The larva of the Apple Curculio has no legs and is so hump-backed that it can not stretch out, and would cut a sorry figure in attempting to descend the tree. Therefore, as the fruit containing it mostly hangs on the tree, the insect is effectually imprisoned. But Nature's ways are always ways of wisdom and her resources are inexhaustible! Consequently we find that instead of having to go under ground to transform, as does the Plum Curculio, the normal habit of our Apple Curculio is to transform within the fruit. The larva after becoming full fed settles down in a neat cavity, and soon throws off its skin and assumes the pupa state, when it appears as at Figure 8, *a*. After remaining in this state from two to three weeks it undergoes another moult and the perfect beetle state is assumed. We thus see that the Apple Curculio is cradled in the fruit in which it was born till it is a perfect beetle, fully fledged, and ready to carry out the different functions and objects of its life. In other words, it never leaves the fruit, after hatching, till it has become a perfect beetle. This fact I have fully tested by breeding a number myself both from infested crabs which I collected, and from cultivated apples, also infested, that were kindly forwarded to me by Mr. J. B. Miller of Anna, Ill. I learn also from Mr. Geo. Parmelee of Old Mission, Mich., that he has satisfied himself of the same trait in the natural history of this insect, and I fully convinced myself that such was the normal habit, by repeatedly removing the full grown larva from the fruit and placing it on the surface of the ground, when, in every instance it would make no attempt to bury itself, but would always transform on the surface.

THE AMOUNT OF DAMAGE IT DOES.

The observations that I have been able to make on this insect's work in our cultivated orchards are limited, but I think that it attacks with equal relish both summer and winter apples. Whenever a beetle has

perfected in the fruit, it cuts quite a large hole for its escape, and these holes are sufficiently characteristic to enable one who has paid attention to the matter to tell with tolerable certainty whether an apple has been infested with Apple-worm, Plum Curculio, or Apple Curculio—even after the depredator has left.

In the southern portion of Illinois and in some parts of Missouri this insect is very abundant and does much damage to the apple crop; it occurs in greater or less numbers in most states of the Union, but in other localities again its work is scarcely ever seen, and I am satisfied that the damage it does has been much overrated. We can only judge of the future by the past, and though we may expect this insect to increase somewhat with the increase of our orchards, it is folly to suppose that it can go on increasing in geometrical ratio; and the pretty mathematical calculations which are intended to alarm the cultivator at the gloomy prospects of the future, are never made by those who understand the complicated net-work in which every animal organism is entangled, or who rightly understand the numerous influences at work to keep each species within due bounds. Such figures look well on paper, but, like air-castles, there is nothing real about them.

Our apples suffer much more, in many localities, from the gougings of the perfect beetle and the burrowings of the larva of the Plum Curculio, than they do from the work of this Apple-Curculio; and this was so much the case in my own locality the past summer, that I found a dozen larvæ of the former in apples, where I found one of the latter.

[At the meeting of the Society, Mr. E. Daggy of Tuscola, Ills., had on exhibition some pears that were very much deformed and gnarled. After the reading of this paper he informed me that this injury had been caused by the Apple Curculio, which he recognized from my figure and from the specimens in the lecturing box. Upon examining the pears I found a little dark circular spot which indicated distinctly where the snout of the beetle had been inserted. This spot was the centre of a hard and irregular but generally rounded knot or swelling which was sunk in a depression of the softer parts of the pear, thus indicating that the growth, by some property of the puncture, was checked and hardened, while the other parts went on growing and swelling. Some of the fruit was so badly disfigured that it could no longer be recognized, and Mr. Daggy informed me that his Vicar of Winkfield, and "Sugar Pear" were most affected in this way, and that his Duchesse pears were unblemished].

THE SEASON OF THE YEAR DURING WHICH IT WORKS.

The beetles come from their winter quarters and begin to work on the fruit at about the same time as does the Plum Curculio—if anything a little later. They have generally got fully to work, and larvæ may be found already hatched, by the first of June, and they may be found in the fruit in one stage or another all along through the months of June and July and the greater part of August.

REMEDIES AND PREVENTIVE MEASURES.

Notwithstanding we have had reports published, in the columns of our agricultural papers, of the relative number of Apple and of Plum Curculios captured from peach trees by jarring with the Curculio-catcher, I am fully convinced that such reports were not based on facts, and that we may never expect to subdue this insect by the jarring process. It is not as timid or as much inclined to drop as the Plum Curculio, and though it can occasionally be brought down, it generally remains defiantly on the fruit or on the bough, through the gentlest as well as the severest jarring of the tree. Indeed, its habit of transforming in the fruit, places it in a great measure beyond our control, and I fear that this is one of the few insects with which we can do but little by artificial means. But we have only just commenced to understand this foe, and there is much yet to learn about it. I sincerely hope that the few facts which have been here given, will increase your interest in this insect and enable you to carry on future observations and experiments with a better understanding; so that they will at last result in making us masters of this rather difficult situation. Mr. H. Lewelling of High Hill, Montgomery Co., Mo., who has had much of his fruit injured by this insect, informs me that Tallman's Sweet is preferred by it to all other varieties, and our observations should, as much as possible, tend in the direction of deciding which varieties are most subject to, and which most exempt from its attacks; and which varieties fall most readily when infested by it. For it is obvious that with our present knowledge, the only real remedy which yet exists, is the destruction of the infested fruit, whether upon or off the tree; and it may turn out that although we can not jar down the beetles we can jar down much of the infested fruit, which would, without jarring, remain on the trees.

ANTHONOMUS QUADRIGIBBUS, Say—*Larva* (Fig. 8, *b*)—Average dorsal length when full grown 0.45 inch; soft and white, with a very few sparse soft hairs; arched and wrinkled Lamellicorn-fashion, the space between the wrinkles, and a distinct dorsal vascular line bluish-black. Head free and almost perpendicular, yellowish-brown with the mandibles darker. A pair of polishel ventral tubercles on each of the three thoracic joints, and each bearing a distinct bristle.

Pupa (Fig. 8; *a*)—Average length 0.40 inch. Whitish, the snout of female reaching beyond the tip of wing-cases, that of male not much beyond the elbow of middle femora and tibiæ. Thorax with a few short stiff hairs springing from slight conical elevations. Wing-cases showing the striæ and humps of future beetle, the tip of the upper case usually terminating in a thorn. The nine abdominal joints deeply and distinctly separated, the first showing a rounded scuttellar tubercle; the sides angular, conically ridged and armed on each joint with two brown thorns or bristles, which become stouter towards apex; a transverse dorsal row of about eight similar bristles on the posterior sub-margin of each joint, also becoming larger towards apex: Terminal sub-segment ending in ONE stout, slightly curved, thorn.

THE QUINCE CURCULIO.

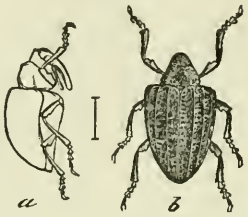
(*Conotrachelus cratægi*, WALSH.)

HOW IT DIFFERS FROM THE OTHERS.

This insect has been called the Quince Curculio by Dr. Trimble, and though it breeds in other fruits, the name is a good one as it will enable

us to distinguish it at once from our other fruit snout-beetles. I have had the beetle in my cabinet for several years but knew nothing of its larval history till a year ago last fall. It breeds very abundantly in our common haws and I raised a number of them the present season from the fruit of the Pear or Black Thorn (*Cratægus tomentosa*) obtained from Mr. Walsh.

[FIGURE 9.]



Quince Curculio—(*a*) side view; (*b*) back view.

Though belonging to the same genus as our Plum Curculio, and having very much the same form, as may be seen by referring to the figure, (Figure 9), yet it differs remarkably in its habits from both of the preceeding weevils. It is, like them, an indigenous species and its original fruit was evidently the wild Haw, which in the West it yet seems to prefer to the cultivated fruits. But in the East it has become very injurious to the Quince and, as we might naturally expect, also attacks the Pear, and especially the Lawrence and other late varieties. In September 1868, I received specimens from W. W. Swett of Hightstown, N. J., with the statement that they were found on pears, and Dr. Trimble at a late meeting of the New York Farmers' club (Oct. 22, '70) gave the following account of its injuries in New Jersey the present year:

"Yesterday five or six hundred were taken from the bottoms of two barrels of quinces, although those quinces had only been gathered four days before. A friend of mine has a quince orchard of 286 trees. These trees this season should average seventy or eighty quinces to a tree, making more than twenty thousand. Upon a most careful search I was unable to find one specimen perfect, or clear of one or more blemishes caused by the punctures of this insect. Frequently four, five, or six grubs will be found in a single quince. Mr. Goldsmith, the owner, keeps this orchard in first-rate order; he has faithfully kept out the borers, so fatal to the quince trees; has fertilized very freely, and the cultivation is perfect. He told me yesterday, that his crop this year is thirty barrels, which will yield him about $125. Had this insect let him alone he should have had at least 100 barrels, worth from $800 to $1,000. Many of his later pears, including the Seckel and Lawrence, have suffered greatly, though not to the same extent as his quinces. A few days ago he emptied a barrel of cullings, chiefly Lawrence pears, and in and near the bottom of that barrel were found at least 400 of these grubs. A month ago I visited the orchards attached to one of the best nurseries in Pennsylvania, and I found the sad evidence of the presence of this enemy. Even the Seckel pears, though very abundant, were almost worthless; later varieties still worse. Mr. Fuller tells me that he has seen this season, in Western New-York, the same condition of fruit at a well known nursery, even the Duchesse pears almost totally destroyed. This fruit enemy seems yet confined to localities, but is spreading rapidly."

This beetle was first very briefly described by Mr. Walsh in a note in the *Prairie Farmer* for July 18th, 1863, p. 37, from specimens found

by him on the hawthorn, but until I bred it this spring nothing was known of its larval history. It is a somewhat larger insect than the Plum Curculio, has a comparatively longer snout and is very broad shouldered; thus tapering just the opposite way to the Apple Curculio. Its general color is a tolerably uniform ash-gray, mottled more or less with ochre-yellow, dusky and whitish, and it has a dusky somewhat triangular spot at the base of the thorax above, and seven distinct narrow longitudinal elevations on the wing-covers, with two rows of punctures between each.

This beetle differs further from the others, in the fact that it does not appear, even in the latitude of St. Louis, till about the first of June, and I have had its larvæ of the previous year in the ground in May when the newly hatched larvæ of the Plum Curculio were already working destruction in the fruit. In some of the more Northern States it would not appear till the middle of July.

ITS TRANSFORMATIONS AND HABITS.

This snout-beetle does not make a crescent like the Plum Curculio; but, like the Apple Curculio, makes a direct puncture for the reception of its egg, the hole being somewhat larger than that of the latter, and the bottom of the cavity similarly enlarged and gnawed, so as to form a neat bed for the egg. The egg is very similar to that of the Plum Curculio, and hatches in a few days after being deposited. In all probability it also swells and enlarges somewhat before hatching. The larva works for the most part near the surface of the fruit and does not enter to the heart. It is of the general form of that of the Plum Curculio, and differs principally in being somewhat larger, more opaque-white, and in having a narrow dusky dorsal line and a distinct lateral tubercle on each joint. When full grown, which is in a month or more from the time of hatching, it leaves the fruit through a smooth cylindrical hole and burrows two or three inches into the ground. Here, singularly enough, it remains all through the fall, winter, and spring months without changing—no matter whether it left the fruit as early as the first of August or as late as the first of October. This is the peculiar feature of the insect, namely, that it invariably passes the winter in the larva state, and does not even assume the pupa state till the fore part of May or a few days before issuing as a beetle. In this respect it resembles the nut-weevils which infest our hickory-nuts, hazel-nuts, and acorns. In higher latitudes than that of St. Louis there is evidence that some of the late hatched larvæ do not leave the haws they infest till frost overtakes them, but pass the winter within the fruit as it lies on the frozen ground. The pupa differs only from that of the Plum Curculio in the greater length of the proboscis.

It will be remembered, perhaps, by many members of this Society, and I have before referred to the fact, that Dr. Fitch supposed the Plum Curculio was two-brooded, and those who have read his "Address" on this insect will readily perceive that he based this opinion on finding what he took to be its larvæ in the tender bark of a pear twig late in the

fall, and on finding what he similarly mistook for such larvæ in haws in winter. Of course we know positively now that the Plum Curculio does not so breed in pear twigs, and it is very evident that what Dr. Fitch took to be Plum Curculio larvæ in such a twig were the young of some other insect, or perhaps even the eggs of some leaf-hopper (*Tettigonia*) which are generally placed in the position described by him. But though this first error of Dr. Fitch's has been explained away, the second never has till now, when we may assume, with great reason, that the larvæ which misled the Doctor and which were found in haws in winter time, were in reality the larvæ of our Quince Curculio. How easily are fallacies exploded, and errors corrected, even years after they are committed, by a few well tested facts!

The two former Curculios which we have been considering have a beetle existence of between nine and ten months, during most of which time, or as long as the weather is sufficiently mild, they feed in the manner described. The present species has a beetle existence of not more than two months, and as though aware of the short term allotted to it for enjoyment, it endeavors to make the best use of its time. Consequently we find it more ravenous than either of the other species, and it is really astonishing how much this insect eats. It excavates immense holes for food, often burying itself in them completely; and I have known apples furnished to these beetles in confinement, to have their substance so completely devoured, that nothing but the rind was left. Two years ago this fall there was scarcely a quince that came into the St. Louis market, that was not marred by numbers of large gougings, and though I was then inclined to attribute such holes, to the gnawings of grasshoppers, I feel pretty well convinced at present that the work might with more justice have been attributed to this Quince Curculio.

The question will naturally arise, since this insect breeds in the haw, the quince, and the pear, whether it will also breed in the closely allied apple? So far as my experiments go, they indicate clearly that it will not; for although the beetle will eat and greatly disfigure apples, when no other nourishment is at hand, yet a number which I confined to a large branch of an apple tree on the 14th of June last, absolutely refused to deposit eggs and died three weeks afterwards.

REMEDIES.

Very fortunately this insect drops as readily when alarmed as does the Plum Curculio, and the jarring process will be found just as effectual in catching it, with the additional advantage that the jarring need only be carried on for about ten weeks of the year, namely, from about the first of June to the middle of August in this latitude. Moreover, in accordance with its late appearance we find that, according to Dr. Trimble, whenever it attacks pears, it prefers the late ripening varieties. Again, it is, like the Plum Curculio, nocturnal in its habits, and secretive during the day; so that the Ransom process will undoubtedly prove effectual with it if used at the right season. All fruit that falls should be destroyed, and as we know that the larva hibernates in the ground,

many of them will be injured and destroyed by late stirring of the soil.

CONOTRACHELUS CRATÆGI, Walsh—*Larva*—Average length when full grown 0.32 inch; 4½ times as long as wide, and straight. Opaque whitish, with a narrow dusky dorsal line, generally obsolete on thorax, and a few very short hairs. Distinct lateral tubercles on all the joints. Head rufous with mandibles black, except at base, and distinctly two-toothed at tip.

Pupa—Average length 0.28 inch. Snout reaching a little beyond elbow of middle tibiæ and tarsi, with two stout rufous thorns near the origin of antennæ, two more at base and sometimes others more toward the tip. Head and thorax also armed with such thorns, and also two to each elbow of the femora and tibiæ. Wing cases with rows of short rufous bristles along the elevations between the striæ. Abdomen cylindrical, the basal joint with a central scutellar bristleless tubercle and two others, one each side of it, each bearing a bristle: the other joints conically tubercled laterally, each tubercle bearing a stout bristle, and each joint bearing dorsally about four other bristles on its posterior sub-margin. Terminal sub-segment squarely cut off and bearing two stout inwardly-curved brown thorns.

THE PLUM GOUGER.

(*Anthonomus prunicida*, WALSH.)

ITS CHARACTER, DISTRIBUTION, AND FOOD.

[FIG. 10.]

The Plum Gouger.

This name was given by Mr. Walsh to another indigenous weevil which is represented enlarged in the accompanying illustration (Fig. 10). It is easily distinguished from either of the preceeding weevils—as you will see at a glance by referring to the figures and to the specimens in the lecture-box—by its ochre-yellow thorax and legs and its darker wing-covers, which are dun-colored, or brown with a leaden-gray tint, and have no humps at all. Its snout is not much longer than the thorax, but as in the Apple Curculio, projects forwards, or downwards, but can not be bent under as in the Plum Curculio. This insect was first described in the *Prairie Farmer* for June 13th, 1863, and the description was afterwards republished in the Proceedings of the Boston Society of Natural History for February, 1864.

Mr. Walsh gave such a good account of it in his Report as Acting State Entomologist that it is unnecessary for me to go into detail, and I will therefore only briefly allude to those traits in its history which are well established.

The Plum Gouger seems to be unknown in the Eastern States, but is very generally distributed throughout the valley of the Mississippi. As a rule it is much less common and does much less injury than the little Turk, though in some few districts it is found equally abundant, and I

received specimens on the first of June last, from my esteemed correspondent, Mr. Huron Burt of Williamsburg, Callaway Co., Mo., with the statement that it was doing great damage to the plums in that locality, though the little Turk was scarcely met with. There is a plum known there as "Missouri Nonsuch" which, though said to be Curculio proof, is worked upon very badly by the Gouger.

The Plum Gouger is often found on wild crab trees, and may, like the Plum Curculio, occasionally deposit and breed in pip fruit; but it is partial to smooth-skinned stone fruit such as prunes, plums, and nectarines, and it does not even seem to relish the rougher-skinned peach.

OFTEN MISTAKEN FOR THE PLUM CURCULIO.

It has often been confounded with the Plum Curculio, and was once supposed by our friend L. C. Francis of Springfield, Ills., to be the male of that species. We all have a right to suppose what we please, and as long as our suppositions are not thrust on the public for ascertained facts, they can do no possible harm. But Mr. J. P. Williamson, of Des Moines County, Iowa, is not satisfied with supposing this or some other straight-snouted weevil, to be the female of the Plum Curculio, but, in a last summer's issue of the *Prairie Farmer*, not only emphatically speaks of it as such, but, finding that these supposed females frequent the trees two weeks earlier than the males, (?) he concludes for some unexplained reason, that the sole object of visiting the fruit is for the deposition of eggs; and straightway hatches the theory that the Plum Curculio can do no harm till the males appear!! Consequently, instead of jarring our trees as long as fruit remains on them, we are informed by Mr. Williamson that it is only necessary to jar them about six weeks.

And thus it always is with men who do not sufficiently understand the absolute importance of care and caution in reading Nature's secrets: from supposition to assumption; from assumption to theory; from theory to advice, which—it is unnecessary here to say—is of a most pernicious character.

ITS TIME OF APPEARANCE.

This beetle appears in the spring about the same time as the Plum Curculio, but as no eggs are deposited after the stone of the fruit becomes hard, and as its larva requires a longer period to mature than that of the latter, its time of depositing is shorter, and the old beetles generally die off and disappear before the new ones eat their way out of the fruit, which they do during August, September, and October, according to the latitude.

ITS NATURAL HISTORY.

Though we have no absolute proof of the fact, analogy would lead us to believe, and in my own mind there is no doubt, that this insect passes the winter in the beetle state, and that it is, like the other species, single-brooded. Both sexes bore cylindrical holes in the fruit for food, and these holes are of the exact diameter of the snout, and consequently somewhat larger than those of the Apple Curculio. These holes are

broadened at the bottom, or gouged out in the shape of a gourd; and especially is this the case with those intended by the female for the reception of an egg. The egg, in this case also, enlarges from endosmosis, and it is probable that all weevils that make a puncture for the reception of their eggs, gnaw and enlarge the bottom, not only to give the egg room to swell, but to deaden the surrounding fruit, and prevent its crushing such egg—the same object being attained by the deadened flap made by the crescent of the little Turk. Wherever this insect abounds, plums will be found covered with its holes, the great majority of them, however, made for feeding purposes. The gum exudes from each puncture, and the fruit either drops or becomes knotty and worthless.

The young larva which hatches from the egg, instead of rioting in the flesh of the plum, or remaining around the outside of the kernel, makes an almost straight course for that kernel, through the yet soft shell of which it penetrates. Here it remains until it has become full-fed, when by a wise instinct it cuts a round hole through the now hard stone, and retires inside again to change to the pupa and finally to the beetle state. When once the several parts of the beetle are sufficiently hard and strong, it ventures through the hole which it had already providently prepared for exit with its stronger larval jaws, and then easily bores its way through the flesh and escapes.

REMEDIES.

This Plum Gouger is about as hard to deal with as the Apple Curculio. It drops almost as reluctantly and we therefore can not do much by the jarring process to diminish its numbers. Moreover it takes wing much more readily than the other weevils we have mentioned; and though fruit that is badly punctured for food, often falls prematurely to the ground, yet, according to Mr. Walsh, that infested with the larva generally hangs on the tree until the stone is hard and premature ripening sets in. In all probability the stunted and prematurely ripened fruit containing this insect will jar down much more readily than the healthy fruit, but I have so far had no opportunity of making any practical observations myself, and must conclude by hoping that our plum-growing members will make the proper experiments and give us the results.

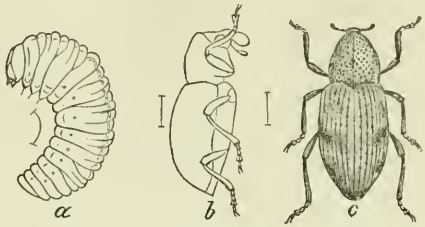
THE STRAWBERRY CROWN BORER.

(*Analcis fragariæ N. sp.*)

This is another indigenous insect, which seems to be confined to our Mississippi Valley, for I have heard no complaints in any of the Atlantic States, of injuries that could be attributed to this weevil. In the *Maine Farmer* for July 25th, 1867, we find a brief reference, made by Mr. G. E. Brackett of Belfast, Me., in answer to a certain "E. B.," of a "worm that eats into the crown of the plant and kills it." The worm referred to was, in all probability, the Crown Borer under consideration, but as no post-office address of the questioner is given, the paragraph might just as well never have been written, for any light that it throws

on the distribution of the insect. However, no such insect has ever been mentioned by our Eastern writers on the Strawberry, and we must necessarily conclude that it does not exist in the Atlantic States.

[Figure 11.]



Strawberry Crown Borer—(*a*) larva; (*b*) beetle, side view; (*c*) same, back view.

This insect has done considerable damage to the strawberry crop in the Southern portion of your own State, especially along the line of the Illinois Central R. R.; and I have seen evidence of its work in St. Louis County, Mo. At the meeting of the Southern Illinois Fruit Growers' Association, held at South Pass in November 1867, several complaints were made by parties from Anna and Makanda, of a white worm which worked in the roots of their strawberries; and in 1868, the greater portion of the plants of a ten-acre field at Anna, belonging to Mr. Parker Earle, was destroyed by it.

In the fall of 1869 I had some correspondence with Mr. Walsh on this insect, and learned that he had succeeded in breeding it to the perfect state; and had it not been for his untimely death, its history would no doubt have been published a year ago. Through the kindness of Jos. M. Wilson of Sterling, Whiteside Co., and of J. B. Miller of Anna, Union Co., I received during the past year specimens of the larvæ from which I succeeded in rearing the perfect beetle. It is therefore by the aid of these gentlemen, and especially from the experience of Mr. Miller, that I am enabled to give you the above illustrations (Fig. 11) of the Strawberry Crown Borer, and the following necessarily imperfect account of its mode of working. I give them in the hope that they will prompt further investigation, and serve as a clue to enable our excellent friend Dr. Le Baron to increase our knowledge of this pest; for there is much yet to learn of its habits, and consequently of the best means of fighting it.

From the middle of June to the middle of July in Southern Illinois, and later further north, the larva hatches from an egg which, in all probability, is deposited in the crown of the plant, and it immediately commences to bore its way downwards, into the pith. Here it remains till it has acquired its full size, working in the thick bulbous root and often eating through the more woody portions, so that when frost sets in, the plant easily breaks off and is heaved out of the ground. When full grown it presents the appearance of Figure 11, *a*, being a white grub with arched back and tawny-yellow head, and measuring about 1-5th of an inch when

stretched out. It undergoes its transformations to the pupa and perfect beetle states within the root, and the latter makes its appearance above ground during the month of August.

The beetle (Fig. 11, *b* side view; *c* back view) is about 1-6th of an inch in length, of a chestnut-brown color, and marked and punctured as in the figure.

From analogy we may infer that the beetle feeds on the leaves of the strawberry, for it is a very general rule with snout-beetles, that the perfect insects feed on the leaves of such plants as they infest in the larva state. But whether it lives on through the winter as a beetle and does not commence depositing eggs again till the following June; or whether it is double-brooded and produces a second lot of larvæ which pass the winter in the roots, are questions which are not yet decided; and until we get a more comprehensive knowledge of this insect's ways and doings, we shall be in a measure powerless before it. From all the facts that can be obtained, the first hypothesis is the correct one, and in that event we can, in an emergency, easily get rid of this pest by plowing up and destroying the plants soon after they have done bearing, or say about the latter part of June in the southern part of the State. By doing this the whole brood of borers will perish with the plants. Most strawberry-growers renew their plants, in some way or another, about every three years, and where this insect abounds, it will be best subdued by destroying the whole bed at the time already suggested and afterwards planting a new one; rather than by annually thinning out the old and leaving the new plants in the same bed. Here we have an effectual means of extirpating the little pest, if, as I believe, the first hypothesis is the correct one; but if the second hypothesis be correct—i. e., if the insect be double-brooded—then it will avail nothing to carry out the above suggestions, and we thus see how important it is to thoroughly understand an insect's habits in order to properly cope with it. Though we may occasionally hit upon some plan of remedying or preventing an insect's injuries without knowing its habits, yet as a general rule we but grope in the dark until we have learned its natural history!

According to Mr. Miller, all plants infested with this larva are sure to perish, and he has also noticed that old beds are more apt to be injured by it than new ones.

In one of the roots received from him, I found a parasitic cocoon, so that there is every reason to believe that, as is so very generally the case with insects, this noxious species has at least one natural enemy which will aid us in keeping it in due bounds. Indeed, Mr. Miller so often found this parasitic cocoon, that he at first surmised that the Crown Borer spun it. But no snout-beetle larvæ spin cocoons.

This Crown Borer must not be confounded with another white worm of about the same size which lives in the ground and subsists on the roots by devouring them from the outside. This last may always be distinguished by having six distinct legs near the head, and its habits are quite different. It occurs earlier in the season, and, as I have proved the past summer, is the larva of the little clay-yellow beetle, known as the Grape-

vine Colaspis (*Colaspis flavida*, SAY). A full account of this last insect, with illustrations, will be given in the forth-coming 3rd Entomological Report of Missouri.

This weevil belongs to the genus *Analcis* which is distinguished by its sub-cylindrical oblong-oval body, its short robust snout which fits into a deep grove, its 10-jointed antennæ, and its simple or unarmed thighs. As our strawberry insect is a new species I subjoin a description of it for the scientific reader:—

ANALCIS FRAGARIÆ, N. Sp.—*Imago*, Fig. 11, *c*—Color deep, sub-polished, chestnut-brown, the elytra somewhat lighter. Head and rostrum dark, finely and densely punctate and with short coarse fulvous hairs, longest at tip of rostrum; antennæ rather lighter towards base, 10-jointed, the scape much thickened at apex, joint 2 longest and robust, 3 moderately long, 4–7 short, 8–10 connate and forming a stout club. Thorax dark, cylindrical, slightly swollen across the middle, and uniformly covered with large thimble-like punctures, and with a few short coarse fulvous hairs, unusually arranged in three more or less distinct longitudinal lines; pectoral groove ending between front legs. Abdomen with small remote punctures and hairs, which are denser towards apex. Legs of equal stoutness, and with shallow dilated punctures and uniform very short hairs. Elytra more yellowish-brown, dilated at the lower sides anteriorly, and with about 9 deeply-punctured striæ, the striæ sometimes obsolete; more or less covered with coarse and short pale yellow hairs, which form by their greater density, three more or less conspicuous transverse bands, the first of which is at base: between the second and third band, in the middle of the elytron, is a smooth dark-brown or black spot, with a less distinct spot of the same color below the third, and a still less distinct one above the second band. Length 0.16 inch.

Described from four specimens bred from strawberry-boring larvæ. The black spots on the elytra are quite distinct and conspicuous on two specimens, less so on one, and entirely obsolete on the other.

Larva, Fig. 11, *a*—White with back arched Lamellicorn-fashion. Head gamboge-yellow, glabrous with some faint transverse striations above mouth; mandibles rufous tipped with black; labrum emarginate, and with palpi, pale. A faint narrow dorsal vascular line. Legs replaced by fleshy tubercles. Length 0.20 inch when stretched out.

I had intended to say something of the Grape Curculio and the Grape Cane Curculio; of the Hickory-nut and Hazel-nut weevils; of the Pea and Bean weevils; of the Corn-weevil, Grain-weevil and some other destructive weevils, but have already occupied more than the allotted time, and must close.

CONCLUSION.

In conclusion, ladies and gentlemen, I beg leave to assure you that this paper has been written in the true interest of science. If a single word has seemed to animadvert against any one of you, I hope you will believe me when I tell you that no reflections were intended, and that my sole object is the dissemination of truth and facts. If these facts hit with force and shatter some of the beautiful and visionary theories that have been preached to you as gospel, it is not my fault. No one should smother truth on personal grounds or because it conflicts with the expressed opinions of another. We are all liable to make mistakes, and perhaps no man ever yet lived who did not at some time of his life commit a blunder. But the difference between the man who writes for truth and the man who writes for victory, is, that the former frankly confesses

his errors as soon as he is made aware of them, and even courts true criticism, while the latter never will allow that he is wrong, but having once made a false statement, will never go back on his word.

You are engaged in a most glorious work, namely, the advancement of the beautiful art and science of Horticulture. You are each of you doing what you can, in the first place to promote the æsthetic influences of your calling so as to elevate and render it attractive to the young who are constantly seeking occupation in the numerous walks of life; and in the second place to make your business more profitable. To further either, or both of these objects, true science—knowledge—must be applied to all your daily operations. I say true science, because we want none of the bogus article. We must recollect that while man is the interpreter of nature, science is its right interpretation, and that it is the wrong interpretation of Nature's truths that has brought true science into such disrepute among many practical men. We can not each of us become proficient in all departments, and must, to attain the greatest good, confine ourselves in a great measure to specialties. Professor Gould has truly said that "an equal culture in many directions is synonymous with superficiality in all, and an 'admirable Crichton' is to-day simply a ridiculous object."

Science means knowledge, and knowledge means power, and to promote and advance the incipient Science of Horticulture which we are engaged in, we must each of us bring the knowledge gained in our several departments, and offer it upon one common altar for the common good. The man who receives an apple tree from the nursery, and who plants and cultivates it without knowing anything of the insect enemies that are likely to ruin it, will not stand the same chance of raising fine fruit from that tree, as that man will, who, with the requisite knowledge guards against catastrophe, by first examining the young tree so as to destroy bark-lice, root-lice, or the eggs of caterpillars that may be upon it; who afterwards soaps it carefully, to prevent the borers, and eventually when it comes into bearing, properly surrounds its trunk with rags to entrap the Apple-worm; and the same argument applies to all other kinds of knowledge necessary to the proper cultivation of such a tree.

> "A little fire is quickly trodden out,
> Which, being suffered, rivers can not quench,"

and we must always bear in mind in dealing with insects that it is far easier to prevent than to cure.

You are no doubt all of you familiar with the quotation from Dean Swift's account of what the King of Brobdignag said to Lemuel Gulliver; "and he gave it for his opinion, that whoever could make two ears of corn, or two blades of grass, to grow upon a spot of ground where only one grew before, would deserve better of mankind and do more essential service to his country than the whole race of politicians put together."

I take it that we are each of us doing our utmost to carry out King Brobdignag's idea, and in these annual reunions, when by interchange of

the experience of the out-going year, we hope to benefit each other; let the past be forgotten in the kindly feelings of the present and the hopes of the future. Let us, in Tennyson's beautiful language,

"Ring out the old,
Ring in the new,
Ring out the false,
Ring in the true."

Mr. DAGGY had found the Apple Curculio at work on the fruit of the Pear, and exhibited a specimen of the fruit that had been attacked by this insect.

Mr. BLISS said that the extent of the ravages of the Curculio is so great that we should use every means at our command to learn their habits and effect their destruction. He hoped more would be said and much more done in this direction by the members of this Society.

The paper on the Moral Influence of Horticulture which was due at this time was presented by the Secretary—but on account of the absence of the author it was on motion referred to the Executive Committee to be published at their discretion.

The paper of Mr. BRYANT having been omitted from the morning session, for want of time for its reading—he was requested, by vote of the Society, to present it at this time; which he did—reading as follows:

NOTES ON THE CULTIVATION OF SOME OF THE MOST VALUABLE DECIDUOUS FOREST TREES.

The forests of Illinois may be said to be made up entirely of deciduous trees; the few scattered specimens of pines and cedars not being worth taking into account. Twenty years ago there was more wood in the neighborhood of the prairies than at the first settlement of the country; but since the advent of railroads, the destruction of timber has been very rapid. The mission of civilized man in the United States has hitherto been the destruction, rather than the propagation of trees. Many people have no notion of worth in a forest tree aside from its cash value, and would ridicule the idea of preserving a forest longer than till it could be felled and taken to market. Such sentiments appear to have prevailed in very ancient times. Mention is made in the 74th Psalm, of the high regard in which skillful wood-choppers were held. As the old Scotch paraphrase has it,—

A man was famous, and was had
In estima-ti-on,
According as he lifted up
His axe thick trees upon.

The evils resulting from a total destruction of "thick trees" are seen in the utter desolation of large portions of Western Asia, and are ably set forth in the work of G. P. Marsh, entitled "Man and Nature," a book well worth the perusal of every intelligent person.

The inconveniences and physical evils attending a destitution of woodland, can only be prevented by appropriating a certain proportion of each farm to the growth of forest trees. There is reason to believe that if one-fifth of each farm on the prairies were planted with trees, the owners would derive far greater advantage from them, than if they were to remain in their present state.

Tall, straight, clean timber is found only in dense woods, and to produce such in plantations, the trees must be thickly grown while young. Lands designed for timber-planting, if tillable, should be well ploughed and harrowed, and marked out in rows four feet apart, for the reception of the seeds or young trees. Seeds of the different classes of trees require somewhat different treatment.

Undoubtedly the most important class of deciduous trees in our country is that of the Cupuliferæ, or cup bearing trees, which includes the Oaks, the Chestnut, and the Beech.

The most valuable species of this class are, the white-oak, burr-oak, swamp white-oak, post-oak, and chestnut. The seeds should be gathered as soon as ripe, mixed with damp sand before they become dry, packed in boxes, put in a cool place on the north side of a building or fence, and covered with earth; securing them against access by rats or mice. In spring they should be planted as early as possible, one foot apart in the rows. The seeds of the oaks should be planted where the trees are to remain, as they are injured by being transplanted.

The young plants should receive clean culture until they are too large to be smothered by weeds. If they are to be removed it is best to sow in seed-beds and transplant when one, or at most, two years old. The chestnut is sometimes killed to the ground the first winter in northern Illinois. This should be guarded against by ridging up the rows with a plough, late in autumn, or by covering with litter. It is rarely, if ever injured by cold after the first winter.

Among the oaks of Illinois, the white-oak, (*Quercus alba*), is unquestionably the most useful, and is also diffused in the greatest abundance over the country. Its multiplied uses are well known; where strength, solidity and durability are required, it is employed in preference to almost any other tree. Its preservation and propagation is therefore a matter of great importance. There are in this State many tracts of broken land, mostly in the vicinity of the streams, which are covered with young trees, principally oak, that only need preservation to become in time valuable timber.

The burr-oak, (*Q. macrocarpa*), appears to be a stranger to the Atlantic States. It grows in richer soils than the white-oak, and its wood for most purposes is equally valuable. It is more durable when used for posts, but its pores are more open, so that it is not used for casks intended to contain liquors.

The swamp white-oak, (*Q. prinus*, var. *discolor*), is found mostly in low, moist lands. Its wood resembles that of the white-oak, and is by some considered equally valuable, but is much less common.

The post-oak, (*Q. obtusiloba*), is common in central and southern

Illinois. It is said to be found throughout the State, but I have never met with it in the northern part. It will thrive on very poor soils. The wood is heavier, stronger, finer-grained, and more durable than that of the white-oak. It is a middle sized tree, and rarely affords timber of considerable length. The superior quality of its wood renders it well worthy cultivation.

The chestnut is not a native of Illinois, but will grow in all parts of the State. It will thrive in almost any soil except one that is wet. The wood is more durable than white-oak for fence posts, and is much used for cabinet work, and for the inside finish of houses, railway cars, etc.

A grove of the chestnut, if felled in winter will reproduce itself, in fifteen or twenty years, by suckers from the stumps. These suckers grow with astonishing rapidity, and need no other care than the exclusion of stock, and thinning where they are too numerous. Unquestionably it might be profitably planted for the fruit. Three trees 17 years old afforded this year a bushel of nuts, besides the share which fell to the mice and squirrels. For this purpose the trees should be planted fifteen or twenty feet apart.

Next to the oak family the Ashes are the most important trees for general use. The seed of the different species ripens about the first of October, and should be mixed with moist sand and laid by till spring, when it may be sown in seed-beds, and the trees transplanted when one or two years old to the place where they are to remain. Two feet apart is the proper distance to set them.

The white ash, (*Fraxinus Americana*), attains its fullest development in cold climates. Its wood combines lightness with strength and elasticity, in a degree which causes it to be preferred for the manufacture of agricultural implements, carriages, and all sorts of light machinery. The consumption, for this and other purposes is very great, and the supply is rapidly diminishing. The white ash grows faster than the oak, and is one of those trees in which the most rapid growth produces the best timber. It is every way worthy of extensive culture.

The blue ash, *Fraxinus quadrangulata*), is unknown in the Atlantic States. In the West it is usually found in rich soils. It does not grow to so great a size as the white ash. Its wood is applied to the same uses, and is in no way inferior. South of latitude 40 degrees, it would probably be more eligible for cultivation than the white ash, which is essentially a northern tree.

The black ash, (*Fraxinus sambucifolia*), commonly grows in wet soils. The wood is tough and elastic, and the concentric circles are easily separated, thus forming an economical material for hoops.

The red ash, (*Fraxinus pubescens*), and the green ash, (*Fraxinus viridis*), afford timber similar in quality to that of the white ash, but are smaller size.

The walnut family ranks next in this list. The nuts before becoming dry should be laid in heaps on dry ground, covered with straw, and over all three or four inches of earth. In spring they may be planted in the same manner as acorns, except that the black-walnut and butternut may

be placed two feet apart. The hickories, at one foot apart, will grow large enough for hoop poles.

The black-walnut (*Juglans nigra*) is a very valuable tree, of rapid growth and easy culture. Great quantities of its timber are consumed in the manufacture of furniture, gun-stocks, and for various other purposes. The supply is constantly becoming less, and the market value increasing. There is no doubt that it is one of those trees whose cultivation will ultimately produce the greatest profit. The black-walnut should be planted by itself, as it is a bad neighbor for many other trees. Fruit trees planted near it soon perish.

The butternut (*Juglans cinerea*) grows farther north than the black-walnut, and although less valuable, merits cultivation. The wood is used for cabinet work, and the interior finish of houses.

The European walnut (*Juglans regia*) is worth cultivating for its fruit where it will endure the climate, which is not in northern Illinois.

Of the hickories the kinds most valuable for timber are the shell-bark (*Carya alba*) and the pig-nut (*Carya porcina*). The latter affords the longest wood of all the hickories, though their characteristic qualities are much alike. The uses of the hickories are too well known to need enumeration.

The sugar maple (*Acer saccharinum*) and black maple (*Acer nigrum*) are valued for the production of sugar, and for fuel. The seeds ripen in the fall, and should be treated like those of the ash. The young trees grow slowly at first, and should remain in the seed bed two or three years. The silver maple (*A. dasycarpum*) and red maple (*A. rubrum*) ripen their seed in the latter part of May. They must be gathered and sown immediately. The timber of these and the box elder (*Negundo aceroides*) is not of the best, but their rapid growth renders them desirable to plant where a speedy result is wanted. Other valuable timber trees might be noticed, but the limits of this essay do not permit it.

For the management of young plantations of timber, only general rules can be given, and the exercise of judgment and common sense on the part of the cultivator is necessary. Thinning should be done in time to prevent the growth of the trees being checked by crowding, and the poorest trees should be first removed. Some trees throw out too strong side branches, which must be shortened or removed. No tree should be allowed to fork. All dead or sickly branches should be cut out, and after the trees are ten or twelve feet high they should be kept clear of branches for from one-half to two-thirds of their height. With proper care, nearly every tree in a well-grown plantation will be of value for timber.

Stock of every description should be excluded from plantations of trees. Wood lands of natural growth, intended to be permanent, should likewise not be pastured. They will continually reproduce themselves, if young trees are allowed to grow; but any forest will be in time destroyed by a persistent course of pasturage. Many land-holders in Kentucky formerly adopted the practice of cutting out the least valuable trees from their woodlands, sowing blue grass, and pasturing them.

Very fine parks were produced, but for twenty years past the old trees have been fast dying out, and no young ones exist to take their places.

ARTHUR BRYANT.

Mr. WIER—The writer says that acorns should be gathered in the fall, kept in damp sand, and planted in the spring. This plan will answer about three years out of four, but not always, as sometimes the acorns sprout in the fall.

Mr. BRYANT—A part of them sometimes start to grow in the fall, but not all. These may be rejected, though they are as likely to succeed if kept in a cold place and not too wet—as I have directed—as they would if planted at once.

Wr. WIER—I have made a special study of the modes of preserving and planting acorns, chestnuts, etc. If they are dry before being gathered, or become so soon after, they should be soaked in ice-cold water for two or three weeks, and then planted.

Dr. SPAULDING would caution against the planting extensively of silver maples, as they are being destroyed in the vicinity of St. Louis.

Mr. GALUSHA said his neighbor, Mr. Henry Clapp, has eight or ten acres of sandy land planted to silver maples. Trees are from two to six inches in diameter. There are some trees of all the sizes in the plantation injured by the borer, though the damage is not as yet very great. A few have been entirely killed. Generally attacked on the southwest side.

Mr. SCOFIELD gathers acorns and nuts in the fall; spreads upon the ground, covering them with litter to prevent drying; plants them in the spring, when they are cracked.

The borers have attacked his sugar maples.

Mr. RILEY being asked what borer it is that attacks these maples, in reply said it was the common flat-headed Apple-tree borer. The trunks of the maple trees should be soaped in May of each year to keep this borer out. This is an effectual preventive.

Mr. BRYANT—This borer is not confined to apple trees, and hard and soft maples, but also attacks various other species of smooth bark trees. The Maple is particularly exposed to their depredations on account of its smooth bark.

Mr. SPALDING has known the borers to attack white maple trees fifteen to eighteen inches through—working upon them all the way from the ground to where the branches put out, or higher up than he could reach. Some trees had been killed in this way. He feared we should be compelled to stop planting these trees.

Mr. BRYANT—I would as soon think of giving up the apple tree as the maple on *this* account.

Mr. WIER—I have no fears whatever of this borer. We owe its presence to the presence of the Colorado potato-beetle. The enemies which formerly preyed upon the borers, keeping them in check, are now

preying upon the potato-bug. When these disappear they will turn their attention to the borers again.

Mr. NELSON had observed the work of this borer upon the white maple, doing serious mischief.

Mr. BRYANT said that one reason, probably, why the borers were partial to these maples is that they are nursery-grown trees and are somewhat checked and injured in transplanting. The borers always choose trees that are somewhat injured, in preference to thrifty, healthy ones.

Dr. SPALDING asserted that the trees he had described were some of them, when first attacked, apparently healthy. In one instance the large trees mentioned were in close proximity to other varieties of forest trees which were not depredated upon.

Mr. BALDWIN had known these borers ever since he had been cultivating the white maple trees, or nearly twenty years, yet the damage done by them was not very serious and would not give up the tree.

Mr. HUGGINS—I wish to speak in behalf of this tree in Macoupin County. It is valued highly as a shade tree. Is healthy excepting when it has been injured by some cause—then the borers attack it.

Mr. MURTFELDT offered the following preamble and resolution which were unanimously adopted, viz:

Whereas, The ladies in attendance at these meetings have endeavored to get seats near the stage, without being able to do so, therefore

Resolved, that from this time until the close of these sessions, the two front rows of seats, entirely across the hall be reserved for the ladies, and that they be earnestly invited to attend and occupy them.

On motion, the Society took a recess until time for the evening session.

WEDNESDAY EVENING.

Society convened and was called to order by the President, a large audience also being present.

The first business, in order, being a paper on

BIRDS BENEFICIAL AND INJURIOUS TO HORTICULTURE,

BY DR. J. W. VELIE.

The President announced Dr. Velie who read as follows:

Mr. President—and Members of the Illinois Horticultural Society,

By the kind invitation of Mr. O. B. Galusha, your Corresponding Secretary, I have the honor and pleasure of meeting with your Society for the first time, this evening, and to present for your kind approval, a hastily prepared and incomplete paper on a few of our, as yet little known, friends, the birds of Illinois, and, if possible, to enter a plea in their defense.

I am aware it is a difficult task to urge patience in the case of the

"little robbers or pests," as some of our Southern Illinois Fruit Growers are pleased to call them.

And yet there are many fine exceptions, where very much benefit is done by them, and only kindness and protection is wanted in return. The subject of Bird Economy has been a study of much interest to me. for several years, and I can see that very much is yet to be learned.

The time of most Ornithologists of the present day has been devoted, principally, to discovering new species, giving them names, describing the form, plumage, size, and habitat. (The last we shall find of much value).

What we now most want to learn is Ornithology, not in a scientific meaning of the term, but in its relations to "dollars and cents"—a subject which, at the present day is receiving much attention in the old countries of Europe, where the destruction of the small birds has been carried on to an alarming extent; as without the assistance of the birds to destroy insects, vermin and decaying animal matter, man could probably not exist upon the earth.

Since the time of Audubon, Wilson, and Nuttall—whose writings are not only very expensive, but rare and difficult to obtain by most students in Natural History—very little, if anything, has been added to the knowledge of the birds in regard to their food or habits. As the food of many of them can only be determined by the aid of a competent entomologist, Dr. De Kay, in his Ornithology of the State of New York, does not mention those which are beneficial or those which are injurious; a subject which should have been as carefully studied as were the noxious and beneficial insects by Dr. Fitch and Prof. Emmons. Very much has yet to be learned on this, to you, very important subject, and the same uncertainty with regard to the practical value of many of the birds that now exist may continue for years, unless some effort is made to have this subject investigated. It is not enough that birds should be collected, their form, plumage, size, and locality described. To this information should be added the time of arrival in spring; season of nesting in different localities of our State; the distribution of the species; what is their food? insects, fruit or grain? If insects, whether those that are noxious or beneficial, and at what seasons of the year they feed upon such insects; as many species of birds eat insects during the spring, which as soon as fruit ripens feed almost entirely upon that.

My much lamented friend, Prof. B. D. Walsh, was of the opinion that some of the birds eat species of insects which are *beneficial* to the fruit-grower and farmer by feeding upon the noxious species, although of this he was not positive; and during the last few years of his life was exceedingly anxious to have this subject properly investigated; and in addition to his duties as State Entomologist was willing to do his part of the work of such investigation, free of extra expense to the State. One thing is most certain—the birds do interfere, very materially with the entomologist's crops of insects. In the last report of the Commissioner of Agriculture, at Washington, there is a paper written by Mr. E. A. Samuels, on a few of the birds of New England. This is a beginning in the right direction, as he writes of the food of the birds.

But these far away and isolated cases teach us very little in regard to the birds of our own State; as our Fauna and Flora differ as much as do our methods of agriculture from those of the New England States.

Until this work is done, and upon the same plan followed by Mr. S., it will be impossible to distinguish friend from foe.

Illinois, extending through more degrees of latitude than any other State east of the Mississippi River, has therefore a greater diversity in her climate, soil, birds, animals, reptiles, and plants, than any of the other States. While the southern portion is peculiarly adapted to fruit-growing, the people of the northern portion of the State confine themselves principally to the cultivation of the cereals. Therefore, a bird which may be injurious to the fruit-grower of the south may be of much value to the grain-grower of the north; and this leads us to the consideration of locality of the species, and the importance of regulating their distribution. This, at first, may seem impossible, yet give us the knowledge we want with regard to the food and habits of the birds, then let our legislatures give us laws based upon such information, and the most difficult part of the work is done; for boys are fond of robbing birds' nests, and we only need to teach them *which to protect* and which to destroy.

Then let us first learn to distinguish friend from foe and we shall soon be relieved from this bird-evil. Many species of birds we know to have changed their habits and localities almost entirely by circumstances that are within the control of man. As an example, Audubon relates that upon White Head Island, at the entrance of the Bay of Fundy, he found the Heron or Silvery Gull, nesting upon the trees to escape the persecution of eggers and vermin; whereas, their usual habit is to nest upon the ground.

The Red-head Wood-pecker (*Picus erythrocephalus*, Wilson), once quite common in New York, is now seldom seen there, and your own Prairie Hen (*Cupidonio cupido*) is fast disappearing, as the prairies are settled up, and will, unless most stringent laws are properly enforced, become a bird of the past in this, the Garden State of the World.

As evidence of what can be done in the opposite direction, I will relate some of my own experience with the birds upon a small city lot, 45 by 150 feet. Previous to my obtaining possession of it in 1862, it is doubtful if a bird had nested on it for years. In 1865, by care and protection, there were five species nesting there; and of one of these species five families; this last was the Purple Martin (*Progne purpurea*). The other species were the Blue Bird (*Sialia sialis*), White-bellied Swallow (*Hirundo bicolor*), House Wren (*Troglodytes aedon*), Chirping Sparrow (*Spizella sogialis*), and in the spring of 1867 a robin and mate added their company. And although so many different species were nesting and rearing their young on so limited a space, all lived harmoniously together, except the wrens, who were always quarrelsome, giving the others much trouble. In the same year (1867) I removed to New York, and now (1870) there is but a single feeble colony of Martins remaining.

Thus we can, by kindness and protection, attract the birds about us, to beautify our homes, or charm us with their melody; or by using the

opposite means—continually harassing them during the nesting season—may drive them away to other localities. And I will here remark, that the proper time to war against the birds is during the nesting season, as one nest destroyed is as good as a dozen birds killed.

Not wishing to give the observations of other writers upon the subject of the food of different species, I will confine myself to the limited number of observations made by myself of a few species, with times of their arrival at Rock Island in spring, taken from my notes, which I kept for nearly ten years.

In the order *Raptores*, or birds of prey, which order includes the Vultures, Hawks, Eagles, and different species of owls, there is quite a diversity of opinion among naturalists, some claiming them all more or less beneficial, while others contend that but a few are so.

The most of the species of this order are difficult to obtain, consequently I have examined but few.

The Sparrow Hawk (*Falco sparverius*) arrives at Rock Island early in March. I have found his food to consist, early in the season, of birds and mice, and later of grasshoppers. I have caught him, in spring, more frequently eating small birds than the other kinds of food named, and I should, therefore, condemn him to the fruit-grower, while I think him beneficial to the grain-raiser.

The Rough-legged Hawk (*Archibuteo lagopus*), a winter visitor among us, makes his principal food—as I have discovered by dissection—of mice, the "small field mice" (*Arvicola*). I have shot these hawks in winter, in the oak groves, where there were numerous prairie hens, but did not find any but the first-named food in their crops.

The Marsh Hawk, or Hen Harrier (*Circus Hudsonius*), is one of the most industrious of the Hawk tribe, as you will see him day after day slowly sailing over your meadows on the prairie. You may always tell this hawk by the broad white band across the tail of the females and young males. That of the adult male is a fine light blue, but he is seldom captured in perfect plumage. I have shot but one with perfect plumage; that was on the plains of Nebraska, beyond Fort Kearney. The principal food of this species is small mice, grasshoppers, frogs and other vermin; and although he sometimes makes an occasional meal from some wandering poultry, I consider him, on the whole, one of the most valuable of the species.

The Sharp-shinned Hawk (*Accipiter fuscus*), a beautiful, daring little species, as far as my observation has reached, prefers small birds to any other kind of food, and does not scruple to attack birds of far more weight than himself.

In March, 1863, Mr. R. B. Taylor, of Rock Island, brought me a very fine specimen of the Broad-winged Hawk (*Buteo Pennsylvanicus*), whose crop I found, upon dissection, to contain the remains of one field-mouse, some half dozen of a species of cetonia (*Euryomia Inda*), and about the same number of a large species of grasshopper (*Acridium Americanum*). The last found only in Southern Illinois.

The Swallow-tailed Hawk (*Nauclerus furcatus*), the most beautiful

of all the hawks, and once quite common in this State, is now seldom seen. It is abundant in Western Iowa at the present day, as I have seen a half dozen at one time, in that locality, flying over the prairie in search of their food, which consists entirely of snakes, lizards, frogs, beetles, and grasshoppers.

Of the *eagles*, among which is the bird of our country, I can say but little in praise, and although from national pride I would suffer them to live, yet I consider them thieves and robbers.

Owls, coming next in order, and last of the *Raptores*, may, as a class, be considered beneficial, some of them particularly so. The two small species, which are quite common in this State, viz: the Mottled Owl (*Scops Aiso*) and the Saw-whet Owl (*Nictale Acadica*) being the best of mousers, living, as the first species does, during winter, in the barn, and almost wholly upon mice, those pests to the farmer, and during the summer, with the above food, consuming large moths and beetles.

The *Scansores* or Climbers includes the Woodpeckers and Cuckoos.

Of the first I can not say much for or against, as I am not yet satisfied whether they are or are not more beneficial than injurious. But of the two species of Cuckoos, the Yellow-billed and the Black-billed, the first of which is quite common in Northern Illinois, I can speak in firm praise, as I have known a small orchard, which was terribly infested with the American Tent-Caterpillar, entirely cleared of this great pest of the orchardist, by a single pair.

The next, a third order, which includes the Insessores or insect-eating birds, is the one in which we are all very much interested, as it contains nearly all of our insect-eating birds.

The Blue Bird (*Sialia sialis*), arrives at Rock Island about the 24th of Feb. to 1st of March. His food consists, in spring, entirely of insects. It is not a seed-eating bird until small fruits are ripe, when it sometimes takes the seeds, covered with their delicious envelope.

The Warblers, as far as determined, are all beneficial; their food consisting entirely of insects, spiders, and bark-lice. But we can not keep them among us; many of them prefering to migrate farther to the north, to nest and rear their young, though a few of them remain among us during the summer months.

The *Hirundinidæ*, Swallows and Martins, arrive at Rock Island about March 25th. Mr. Green Smith has brought a charge against the martin, but I will not condemn him for catching a few (*Sibellala*), or Dragon Flies, for every year, he saved me many a fine dish of Doolittle Black-caps, by driving away the blue-birds, cat-birds, robins, and black-birds. I have found it a sure protection against the depredations of these birds to place the martin-house among or very near the raspberries, as the young are usually hatched about the time the fruit is ripe; and during this season the martin is very pugnacious, and keeps the neighborhood clear of intruders.

Of the swallows I have heard no complaint, and would, by all means, cultivate their company by building boxes in plenty, for them to occupy.

Of the *Laniidæ*, or Shrikes, we have but two species, the Great

Northern Shrike, or Butcher Bird, and White-Rumped Shrike. The first is a winter visitor only, remaining about the cornfields and feeding almost wholly upon mice.

The White-Rumped remains in this State during the summer. Its food consists principally of small snakes, grasshoppers, and beetles.

The Night Hawk and Whippowil both feed upon insects, but whether those beneficial or injurious to the fruit grower, is yet to be learned.

In this order, also, are the *Certhidæ* or Creepers, both the White and and Red-Bellied Nuthatches. Of these species, the former is very common; but of the latter, very few are found in this State, as I have seen but two, in many years' collecting—one at Rock Island and the other in Lincoln Park, Chicago. These active, industrious little fellows are continually at work doing good, running over the bark of the fruit and forest trees, in search of bark-lice and the eggs of spiders, and the small moths; and although few remain with us to nest, yet, as they come here to spend the winter, they should by all means be protected. Being very tame, many are killed by boys, with stones; as I have seen in several instances, within a few weeks in this city, (Chicago).

The same good may be said of the Black-cap Titmouse (*Parus Atricapillus*), which remains during the whole year, and may be seen during the coldest days of winter, in the orchards and forests, looking after his favorite food, the bark-louse and the eggs of small moths.

The Buntings, Finches, and Sparrows, nearly all of whose food consists of seeds, may with propriety be classed among the beneficial birds, as they devour immense quantities of noxious seeds which would otherwise be scattered by the winds to propagate again. A few of them eat insects, but whether those beneficial or injurious, I am not yet certain.

Among the *Rasores*, or Game Birds, I will make mention of our beautiful little Quail (*Ortyx Virginianus*), whose good services in destroying noxious seeds and insects, merit for them the kindest care and protection, and if I was "lord of the soil," I would not allow one of them killed upon my premises at any season of the year. I have heard from several persons—one, in particular, was Prof. B. D. Walsh—that the quail eats the chinch bug. Of this I have no positive evidence, but would like to have this very important information confirmed. In nearly 20 specimens of quails, dissected last winter, I did not find that number of grains of corn. The crops were all filled with the seeds of noxious weeds, although the specimens were all shot in a cornfield.

Among the Water Birds (*Grallatores*), there are none that deserve particular mention except, perhaps, the *Actiturus bartramius*, Old Field Plover, which nests on the prairies and in the cornfields. He destroys many grasshoppers, beetles, and small snails, doing us some good, and certainly no harm.

The order *Natatores*, or "swimming birds," includes Geese, Ducks, Loons, and Grebes. These birds I consider neither especially beneficial or injurious, except that they sometimes damage the farmer by feeding in his cornfields in the fall.

You will perceive that in the above few species enumerated, I have

made no mention of the Robins, Cat-birds, Thrushes, or Blue Jays. Very much has already been written in regard to both the benefits and injuries done by these birds. Some in writing from the southern part of the State claim them to be injurious, while the "Douglas" from the North, claim these and also the gluttonous Cherry Bird (*Ampelis Cedrorum*), to be beneficial. This last I have looked upon as a *Cherry glutton*, in the last degree. I prefer to pass no judgment upon the other species until I have determined the truth by careful, personal examinations of them in each of these localities.

J. W. VELIE, Chicago.

Prof. J. B. TURNER was next introduced to the audience and delivered his promised lecture on

EDUCATION.

There was a monomania in ancient times, both among the Persians and Spartans, and among the more recent Christians, which mistook asceticism for education; just as our American monomania mistakes SCHOOLING for EDUCATION. Simple schooling can no more constitute education, than simple eating can constitute health; all that it is possible in any case to get out of formal school-rooms of any sort, makes but a very small part of the real education, even of that small professional class of men, with whom books are at once their tools and their stock in trade in all their after life. We are all fully aware how raw and ungainly and almost uneducated the divine, the doctor, the lawyer, and cadet, each and all are, even in the line of their own life-work, when they first come from the schools; however protracted their studies may have been, calling them educated is much like calling the oak grown, while yet the acorn is hardly sprouted; but of the proper education of all other men, it must of course constitute a still smaller part. For example, John C. Calhoun was a much more thoroughly schooled, but a far worse educated man than Abraham Lincoln; and this whole continent, in all spheres of life, is full of similar examples. Our Fred Douglasses, and Revels, and multitudes of others on the ebony side of the Republic, seem especially to intimate to us that God and nature have still some little to do in the creation of human souls, as well as the pedagogue and the grammar. Of course, if a man is to deal in books as his life business, as at once the tools of his profession and the source of his stock in trade, and especially if his profession itself is based on mere tastes, expedients, conventionalisms, prejudices and opinions, bare wind, no where to be confronted by solid fact, he needs a more thorough knowledge of books and words, just as the man who is to deal in soils, or machines, or merchandise, needs a more thorough knowledge of these, than mere professional or literary men. But the scholastic habits, like the midæval opinions of former ages, still cling to us on this free soil, even where they can not be of the least use to us, except to retard our earthly progress and becloud and befool our immortal minds. From this source quite an unreasoning controversy has, of late, sprung up in regard to the practical utility of the study of

the dead languages, and of our ordinary collegiate curriculum, as it is called.

At the time those languages were first introduced into the schools of modern Europe, those nations had no written vernacular language of their own; no art, no science, no theology, no law, no literature of any sort, that was not written in Latin and Greek; then, of course, the study of these languages was not only the most practical of all possible studies, but it was the only possible study, so far as books and schools were concerned. Those who knew these languages constituted a scholastic, or learned, ruling class, and all other people learned nothing, and could learn nothing, and knew nothing from schools or books of any sort; and this necessary beginning of things, taken in connection with the stupid inertia, and the conservative force of mere habit, so natural to all men, and especially to all thoroughly schooled men, fully explains all that has since followed and all that now exists. It all grew out of this one root of dire necessity, like all the direful tyrannies and scare-crow theologies that emanated from the same iron age. There was no assembly of wise and grave men that met together to deliberate upon what was best for this human race as such, and to recommend it, because it was the best. On the contrary, the knaves, who ruled the state and the church, had, by their unjust oppression and tyranny, so crushed the people, body and soul, into the earth, that they had no government they could submit to, but a tyranny; no faith they could believe, but a self-evident absurdity; no language they could study, no science, no literature and no art, but only Latin and Greek. The people wisely took what they had, and tried to do the best they could with them. We ought to do the same. But most surely all must admit that in such an age the study of the classics, as they are called, was most eminently practical. What could be more practical, when they were the only possible school-study of any sort?

Again, I well remember when I was a boy, whether by force of law or custom, or both combined I can not now say, in the Eastern States no man could get into the regular ministry, or the practice of law or medicine, or hold any high position or office whatever, in church or state, who had not been through a regular course of Latin and Greek, at some approved college. New England was then ruled by scholiasts and theologians as rigorously, in fact, as Italy is by the ecclesiastics now. I do not say that their rule was, on the whole, a bad one for that people and that age; I only say it existed. Through college—through a regular course of Latin and Greek of some sort, the only road lay, to social, professional, or political distinction of any sort; and the schools outside of the regular colleges and academies, consecrated almost exclusively to the study of Latin and Greek, afforded but a very meager pittance even of rudimental knowledge for any purpose whatever.

A young man in this age of the world can not possibly conceive how utterly all hope of social distinction was bound up in Latin, and labeled in Greek in the minds of all the boys of my age, and the ages before that. True we read of Washington, Franklin, Sherman and others of the preceeding Revolutionary age; but that was an age of miracles.

There were giants, natural giants, we were told in those days; prodigies; men who rose above all law; and we need never expect such an age again. But unfortunately for these theories, the miracles kept multiplying till they became almost the only settled law of nature.

I think it will be seen by all, how eminently practical the study of Latin and Greek was, in an age like that, to all young men who aspired to any social or civil distinction whatever.

The first question that would everywhere be asked the man, as he very well knew, was not what he knew, or what he could do, but where he graduated? But I can scarce believe that all will perceive with equal readiness, that that scholistic age, and the rule which attended it, has now forever passed away from this continent, with no possible hope of its return, whether desirable or not. It is as much impossible to make the boys now born in Illinois hold the same view of this college curriculum that the boys of my own age almost universally held, as it is to take them up beyond the fixed stars, and set them to dreaming over the vacuity and frozen brilliancy that reign there. That style of scholarship was then a practical, and the only practical ruling power in the church and in the state. We boys all saw it to be so. It is not so here now, and never will be; and our boys can not be made to see what does not exist and never will again exist. True something of the kind, though infinitely weaker in degree can be brought to bear on the minds of those already determined to enter the ministry, so-called.

Some few New England families have also striven to keep alive and to transmit to their children, the old New England prejudices of both scholastic caste and scholastic creed; but it is awful hard work for both parents and children; they both make up a world of wry faces over it. And in so far as they really succeed, they become rather outcasts, than the leaders and rulers of this new western age, into which we are all inevitably born, whether we will or no.

I was once myself such an inevitable Yankee scholiast in all my habits of thought and action, that it really seemed to me a sort of sacrilege for such men as Douglas and Lincoln to aspire to the rule of the nation, without any knowledge of Latin and Greek, or any diploma of any sort. But I have at last got bravely over it, and I really believe that I could now listen with composure to the archangel Gabriel, should he deign to speak to me, without asking him to show his sheepskin, or in what college he graduated.

Scholarship is a good thing, just as eating is a good thing, but neither scholarship nor eating, alone, ever made a man, though *no true manhood can be evolved, in this age, without them.* But both are simply *means to this higher end of manhood, and only a small part of the indespersible means at that;* neither is an ultimate end in itself. True manhood, moral, intellectual, and physical, is the only end which we or our schools ought to propose as an end for our children; to be determined, not by simply what they know, but by what they can and will do, either in real mental or physical labor, or both, for the good of mankind; not by the height of the pole they may climb or the wonders they may attract in reaching the

final sphere of their exploits, but in the intrinsic value of their labors, whether in a high or low sphere. Better a thousand times to fill a clam shop or a cabin *well*, than the White-house as it sometimes has been, and I fear often in future will be filled. In other words, worth, not place, is the real test of this true manhood. A drunken, perfidious, and reckless President is far less respectable and shows less of a true manhood, than a careful, discreet, and trust-worthy teamster. It can not be sufficiently deplored that our youth in all our schools are so incessantly goaded onward in this race of scholasticism by the untoward incitants of mere place and power, equally illusory and demoralizing to both teacher and pupil. If a boy has no other or higher ambiton in life than simply to be president, senator, or something of that sort, a mere ambition of place and power, the quicker he commits suicide the better it will probably be for the world, if not for him. We have far too many of these educated, splendid rascals on hand now—more than we know what to do with, in all departments of life; unfortunately we can never kill them off in war, nor starve them out in peace. They contrive to dodge all that, but always at our expense. The best and safest and truest models of imitation to be presented to all our youth in all our schools, are those who have been exalted by no advantages of mere place or power, but who have still done great and true service to their age and their race, in some sphere of useful employment. If such samples are unknown to our teachers, they should be hunted up for the special use of the school-room, for such is the life that the vast majority of our pupils ought to expect, and prepare to lead.

But it is true that the school-room or schooling can take charge, in the main, of only the development of one single part of our three-fold nature, and that the lowest of the three, the mere intellectual. It seems incapable, as yet, of devising any effective drill, or discipline, for the higher faculties of emotion and taste, volition and will, though all know that the power of right-feeling and right-willing is a far higher attribute of any true manhood than any intellectual power of mere correct seeing. It is true that this mere intellectual right-seeing comes first in the order of nature, as the lower things usually do (that is, a man must mentally see before he can either feel or will), and it is therefore, perhaps, properly the main end of the school-room, or at least the main end of its peculiar drill. Right here we see the exact difference between SCHOOLING and EDUCATION. The one provides a drill of more or less value for the development or education of the lowest faculties of the soul, the mere intellectual. But education is the proper development of all the faculties of the whole complex being of man, physical and mental, intellectual, moral, emotional, æsthetic, and voluntary.

The army and navy, the field and the shop, in their actual service, present the best theaters in which to educate and develop power of body and power of will, under due subjection to law and order, and with a natural field for voluntary persistence in surmounting and overmastering the natural obstacles to well-being. The family and the church should present the best discipline for man's moral and emotional nature, and if they fail to do it, no possible day-school can supply that deficiency.

With all these lower bodily and higher moral, and emotional, and voluntary powers of the soul, the school-room, as such, can do but comparatively little for want of the indispensable means for such ends.

It is true that those boys, who are compelled of necessity to rely mainly on themselves and their own industry, skill, and thrift for subsistence, while in the schools, receive incidentally some natural and proper discipline of these higher powers of will and self-government, self-support and self-control; hence we have all come to expect, that such boys in the schools are the ones that will in some line make their mark for good in the world. The reason is, they have been really educated in the higher and more natural forms of moral and social culture, as well as in the lower forms of the bare conventional and intellectual drill of the school-room. The two highest thirds of their complex nature are not left to go to utter waste in an incessant chase after mere intellections. But all this comes not at all out of the prescribed drill, but rather in spite of it. It is true also that whenever the teachers or the classes, and the social surroundings of the school or college, are composed of and led by men of great vigor and force of mind, and WILL, and HEART, the natural and inevitable inspirations of such teachers and such surroundings will arouse and animate, re-inspire and quicken all the dormant energies of the pupil, whatever may be their drill in the school-room; or even if, like Plato and the old Greeks, they walk about in the shade and have no drill at all. But the deadest thing in this dead world of ours is a dead teacher reading the dead words of a dead language to a dead boy out of a dead book. If they do not literally die all in a heap together, it is a miracle of Divine grace, though one can not readily devise what the Lord wishes to keep them alive for. It is one of the mysteries not yet revealed. It is true also that those boys who, as things now for the most part are, seek this more extended drill, are naturally and necessarily the picked boys from select and well-to-do families, who as *naturally* and necessarily become the social, civil, and intellectual leaders of the land, whatever school drill they might be subjected to, or whether to any at all or not. Our schools and school men take an immense amount of very cheap sophistical credit to themselves on this simple ground. If we had no schools at all of any sort whatever, the same boys, out of these same families, would, for the most part, inevitably constitute our civil and social leaders. So, after all, we are beginning to see that the same prescribed drill will no more inspire all souls than the same dose of calomel will cure all diseases, or the same homily on predestination save all sinners.

On these principles in physics, we have brought out and applied some really true American ideas and results; hence, our locomotives, railroads, telegraphs, iron-clads, and manifold mechanisms. In politics we have created, for the most part, a truly new and fine American skeleton, still waiting to be clothed upon with American flesh and inspired with a true American soul. In faith we have gathered a perfect Babel of all the sects under heaven—Christian, Jewish, Mohammedan, and Pagan; all equally inspired of God, and equally incapable of inspiring anybody or

anything else—and yet, we are bound in the end, to be a wholly and purely Christian nation, or perish from off the face of the earth. All our fundamental, civil, and social principles hold us fast to that, if to nothing else. In education we have achieved vast mechanisms, and are applying vast resources. We have a most magnificent mill, and steam power enough to keep every stone and wheel a whizzing from one year's end to another. But what are we in fact grinding out? We are trying, through our schools, to teach some forty millions of people to live by their wits, without work; and surely they must, in the end, have a vast deal of wit or a very poor living. We are fitting them all by our incessant drill in the school-room, to be presidents, governors, preachers, senators, overseers, salesmen, agents, and place or office-seekers of some sort, while we propose to teach none of them simply to think and to work.

This results inevitably from taking all our children out of the natural sphere of the family, the shop, and the field, and confining them in crowds, through all their young and growing years, to the incessant, bare, and bald intellectual drill of the school-room. It is no more possible to inure a boy or a girl to a life of industry and its indispensible habits in the school-room alone, than it is to inure them to a life of scholarship at the plow-tail. The solitude of the ordinary labor of the field and the shop, to the pupil who has lived all his days in the crowd of the school-room, becomes, in itself, intolerably irksome, while the habits, both of the body and of the mind, ground under our present drill, become totally unsuited to its tasks. What would be said of the absurdity of keeping a boy driven night and day, year in and year out, at the anvil, or the plow, through all his growing years, allowing him only some two hours per day to read, in order to fit him for a literary career? Is there a man on the continent who would not at once see the absurdity of such a course? What shall we then say of the converse and parallel absurdity of keeping all boys under the drill of the school-room, year in and year out, in order to fit them for any industrial career, even though we allow them some two hours or more per day for work or play?

The results of this process are already coming before our eyes, if we will but see them. The vast majority of pupils, so schooled, drill them as you will, and on what you will, as soon as they can, will inevitably seek some more congenial mode of life, than that of the shop or the field. The whole force of this so-called education, drives them to this result—by whatever name we please to call it, whether literary or industrial. If other and more public and social spheres of life are open to them, they will seek them; or if not, they will create them, however needless, woe-begone, or disastrous they may be; till no man can save his own soul, or insure his own shins, or sell his own potatoes, without some agent, clerk, or middleman, or place-seeker, or administrator to help him; and take soul, shins, potatoes, and all, in part payment for services rendered. But when this process is fully completed, when an entire generation of forty or fifty millions of people have been so educated, that none of them can endure the solitude and toil of the field and the shop, but all are in an agony to become presidents, or preachers, or insurance-agents, or office-seekers, or

overseers, or middlemen, or clerks, or place-men of some sort, who shall we get to preside over and preach to? and what shall we have to oversee, or sell, or insure? Fifty millions of people, all of whom have been educated and habituated to live without work, simply by overseeing, and insuring, and pleading for, and preaching to, and doctoring and governing one another, will at least be an anomaly in the history of the world, and yet this is exactly, what our present system of common and UN-common schools, logically and inevitably leads to. Hitherto we have had some ten or twelve, or more millions of colored people, and people of foreign birth on hand—not ground through this mill—to do our hard work for us; but now we are getting them all together, black and white, as fast as we can, into this universal hopper, and when we have ground them all through, we fancy that the millennium will surely be on hand; perhaps it will; but I fancy that in any millennium of this world, when all oversee, and no one works, others besides the "lion" will have to "eat straw like the ox"; if indeed they can get any straw to eat. Disguise it as we will, there must needs be a "considerable sprinkling" of down-right hand work on this continent of ours, done by somebody; in order to annually feed and clothe fifty millions of people, whether anybody has been educated to do it, or is willing to do it, or not. It can not all be done by schoolmen, nor overseers, nor clerks; nor even by insurance-agents, or office-seekers. But when no class has been either educated or insured to do it, but all classes, black and white, native and foreign, have been schooled into the same distaste and incapacity for work, as the vast majority of our native Americans have been already, in all our larger towns and villages, where this modern system has had full play, who will do the needful work? Johnny Chinaman may come in to help us out, it is true—but is it probable that any such reliance will serve us? It is true these evils like all other evils will at last cure themselves, either through the timely reforms of social wisdom, or the inevitable disasters of social folly.

"It is an old adage, that "No man can be a perfect fool until he has studied Latin." I have studied it for years, and have therefore a right to the precedence. Like all old, terse, and exaggerated sayings, this one also contains a great truth, namely: that the greatest of all possible fools is the man who makes the book an end, instead of a means; his authority, instead of his help; his master, instead of his servant: for no possible language can be anything more than a bare symbol of some fact, relation, duty, or event, which it is intended to symbolize or signify. If it actually helps us to find the real thing signified, therefore, it is of vast use to us; but if not, it is at best of no possible use at all, and may, and often does, inflict upon us the curse of filling us with wind instead of wisdom for all after life. This results from the very nature of all possible language itself, whether it be true or false, inspired or uninspired. If it does not help us to find in nature and in fact the precise principle, or thing, or event signified, it can do nothing for us, or only what is worse than nothing. The real principles involved in all past events, or supposed events, and the results that are to come out of them, in the present

and the future, are the only things about which a true wisdom is in any degree concerned.

Whoever uses books of any sort simply as a means for finding out those great principles, moral, civil, social, natural, and spiritual, that thus perpetually interlock the present with the illimitable past and future, will be wise; whoever uses them for any other end, will at best remain a fool. These principles can be tested not by mere words, but only by laying them along side of great universal facts in nature, in matter, force, or spirit. No mere authority on earth or in heaven, can, for one moment, rescue any possible form of words from the necessity of this test, or render them of the least use to the human race, in the long run, when it is not applied. To sift the books themselves, and put them vigorously through this indispensable test, is pre-eminently the business of every man on this continent, in whatever sphere of life he may labor. For thus alone can we rid ourselves, our children, and our country, of those nameless and shameless shams, and deceits, in morals, faith, and philosophy, falsely so called, which are ever the worst, most dangerous, and the most absurd, even though the most learned, things we have to do with.

So much for books, general school drill, and Christianity, and their place in every scheme of American education, whether agricultural or horticultural, literary or professional. We can not get rid of them if we would. We would not if we could. We should only learn to use them as the God and Father of all designed that we should use them when he gave them to us. Then shall we be an united, a free and enlightened, a happy and a blessed people indeed.

Entertaining these views, I have no doubt that vast amounts of money and time are at present annually wasted, and worse than wasted, by the American people under pretense of educating their children; and I would really like to see it made a penitentiary offence all over the land, to shut any young person up in the school-room under such pretext of educating him, for more than six months of the year. Whether you drill them on grammar, law, and theology, or on science, horticulture, and mechanics.

The most vital and important fact of education to any man, and especially to any American citizen, is *to learn to live*—to learn and to practice the great lessons of self-government, self-restraint, and self-support, without depending or trespassing upon others; and it is only in very limited and narrow spheres of human life where this greatest of all arts can, to any considerable degree, be taught in the school-room.

Bearing these universal principles in mind, I can now say all that I need say, on special *horticultural* education as such, in a few words. A pupil should be instructed while in the horticultural school in the general and universal principles of his own art as such. He does not propose or need to become a special geologist, or meteorologist, or botanist, or chemist, or entomologist, and least of all a scholar, but solely and simply a *horticulturist.* He does not need to know all the tongues and all the theories of earth, air, and sky, as though he expected to become

omniscient, nor all the Latin names of every plant, tree, fruit, bug, and flower in creation, but only to know those he is likely to be called to meet, to use, or to combat in his own daily vocation, and the more thoroughly he understands these the better. Some of the rudiments and bare outlines of this special knowledge can now be acquired from the books and the schools to the immense advantage of the pupil, while its grand essential whole can only be obtained in the actual study, and toil, and care, and conflict of the field. But it will be found wholly impossible to make the best use of even our extant science for industrial ends, till we have time to make special text-books for each special art.

What the horticulturist or agriculturist needs to know about geology, botany, or chemistry, or entomology, is almost as wholly distinct from what the special geologist, or botanist, or physician, or manufacturer, or chemist, or entomologist, needs to know, or generally does know, as though they were separate and distinct sciences; and yet the greater part of the text-books we actually have, are made by parties, who have wrought in the interests of these specialties and professions; who can not tell us the precise things we need to know, simply because, for the most part, they do not know them themselves.

We do not care by what Latin name any bug, tree, or plant may be called, or to what artificial class it belongs, or what its chemical or medicinal qualities are, except in so far as this knowledge may better enable us to know either how to grow and use them, or how to defend ourselves against them in the field.

Here then lies the greatest of all the works before us; the making of proper text-books for our several special arts, or rather the educating of a new race of men who can make them. When that is done we shall find the fundamental principles, both of horticulture and of agriculture, taught in every common school in the land. Till then, we must grope our way along as best we can.

I trust I have already made concessions enough in regard to the dead languages, to fully satisfy the most radical extreme; and still I wish to see these languages taught in our higher industrial schools and universities, to all who voluntarily desire to study them.

The reason is obvious. We as industrial men must educate our own teachers and professors from our own class, and prepare to make our own text-books, or they never will be made. We can not afford to stand forever, in the republic, as a mere underling class, and depend upon the other professions above us to supply us with all the teachers and professors and text-books we need. But to the man who undertakes to make text-books of any sort, languages, both ancient and modern, are of great importance. They are in fact as much the tools of his trade, as the plow, spade, and the hoe, are the tools of the gardener and farmer. He is distinctly a dealer in words, and not in work; and therefore needs to study words more than work. As words are in the very nature of the case, one of the great instruments of his peculiar life-work—the more thoroughly competent, drilled, sensitive, and certain, he becomes in their true meaning and use, the better he is fitted for his task, all other things being equal.

That absurd and detestable "John Bull" pedantry, which has locked up most of our sciences in a rigmarole of Greek and Latin barbarisms, any to so wide an extent keeps them so locked up, renders it very convenient, to say the least, if not indispensably necessary, that our professors and book-makers should have some knowledge of those tongues. However much we may regret this, for a whole generation to come, it can not be helped. For these and similar reasons it seems to me that it is not expedient for us, in deference to the old college curriculum, so called, to compel all our boys, who seek any sort of knowledge, to dabble away the entire years of their youth in dead languages, and abstractions still more dead, or to shut down the gates upon those of our youth who may honorably and properly aspire to furnish us, and our institutions, with suitable teachers and text-books for each and all of our great industrial arts, and eventually throw their influence and their instruction down over every common school in the land. Still more, on general principles, should any of our sons and daughters from inability for the harder and more manly work of the field, or from inclination or taste, desire to prepare themselves for any profession or pursuit, to which such studies are apposite, why should we debar them? Is it not better for us to throw, even liberally, from our own class, teachers and leaders into other professions and pursuits, than to remain forever as a sort of underlings beneath them in our own? I have thus intimated what I deem essential to all true American and Christian education as a whole, and to horticultural education in particular.

The needful and appropriate details, and courses of study appropriate to these principles, it is not apposite to dwell upon here. They belong to the school-room, and must, to a large extent, be left to the tastes, means, and peculiar necessities of the pupils themselves. We want no iron beds for any boy or man, not even if it is wreathed in flowers. And beside, as I have already intimated, it will be a whole century yet, and perhaps several of them, before the best thing can be done for the horticultural or any other student of industrial science or art. Meantime we must do as we can, even though not as we would.

Mr. SHEPHERD spoke at considerable length, giving a review of the efforts that had been made by the friends of industrial education in the State.

He claimed that the time has arrived when all those who believe in studying *things*, as well as words, should act in concert to commence a reform in our common schools. He had little hope of converting the masses of those who have had their minds steeped in Latin and Greek, until they have become so affected by the process that they can see no other way to become learned, except by following in the same old ruts.

His hope lies in inspiring the young with ideas of true science.

We ought to teach them that true education consists not in mere proficiency in the use of words; that true science consists in unlocking the great book of nature; in discovering processes which are transpiring all around them. To do this the more effectually than can be done

solely through any text-book that we have, he would have the children in the primary schools not only taught the elements of Horticulture and agriculture from books, but would have them encouraged to plant and cultivate plants and flowers. He would have special premiums offered for the productions of boys and girls, in these departments, at our county and State fairs. He would have lists of all the native plants and trees of Illinois printed upon cards, and hung in every school-room in the State, and the pupils taught the names and uses of at least all the most important species and varieties.

Mr. EDWARDS presented the following resolution, which was adopted:

Resolved, That each member of this Society shall be a committee to take such measures as he shall deem desirable for the introduction and encouragement of instruction in Horticulture in the primary schools in his immediate vicinity, and report progress to the Secretary at or before the next annual meeting of this Society.

Mr. PARKER EARLE—from the Committee *ad interim*—complied with a unanimous vote of the society, and read:

P. EARLE'S REPORT, *AD INTERIM*—PEARS.

In the division of labor among the members of your Committee *Ad Interim*, the subject of Pears and Pear culture has been assigned to me. While I have not been able to spend as much time as so important an interest demands, yet I have examined about seventy-five of the larger orchards of our own State, and some in adjoining states, and will give you the substance of the suggestions which their condition has made to me.

I have found among pear growers a more general feeling of discouragement from various causes, than I have before heard expressed. I think the conclusion of most men is, that pear-growing will not pay. To this opinion there are, however, some notable and brave exceptions.

Probably no year before has ever shown so much destruction from blight in our State, and this has been common to nearly all soils and methods of treatment. This is doubtless mostly due to the unseasonable cold of the past two winters. Early in December, 1868, we had the coldest weather experienced in many years, which, following a warm and growing autumn, severely tried the hardiness of all young and fast growing trees, especially in the south part of the State. On the hills at Cobden, the mercury reached 10 degrees below zero, killing many trees, and damaging many thousands beyond the hope of future health. These weakened trees, while yet only convalescent, were struck by the snow-storm of October, 1869, the devastations of which, in both nursery and orchard, will not soon be forgotten. Added to this, we of the south endured the still more ruinous snow-storm of the middle of April, 1870, which killed most of our orchard fruits not only, but the papaws and persimmons, and hickory-nuts, and acorns of the forest. So we have had three destructive crises of cold following within a period of eighteen

months, which, considering the condition of the trees at the several times, has, I think, no precedent in American pear-growing. What wonder that we have had a year of blight—of blight sweeping through all varieties and all ages, from the nursery to the old orchard. The year has therefore been an instructive one for noting the effects of various modes of culture, and the endurance of varieties.

My leading conclusion, not only from this year's observation, but from former experience is, that a pear tree which grows slowly, and whose foliage is healthy and persistent, will never *originate* blight: and though it may succumb like a strong man, when the air is full of contagion, it possesses the best possible power of resistance to the disease. Nature designs all trees as well as all men to be healthy, and pear trees should be as enduring and as reliable in crops as the oaks. But Nature has assigned the oaks, and maples, and pines, to certain specific soils and climates. She has not intended to have all fruits grown in all countries, but has mapped her horticulture so as to secure large commercial interchanges and their civilizing results. Pear culture in this country has mostly ignored these purposes of nature, but she gives us frequent hints of them, which, we may not with impunity disregard.

The authorities in pear-growing commend us to plant in soils either very rich naturally, or very much manured, or both, that we may get luxuriant annual growths; and this in East and West, North and South, on mountain and in valley alike, and for all kinds. Then we are promised pears—a thousand varieties or more. But nature interposes her objections to this system in the form of wood-blight, and leaf-blight, and fungus on the roots, and fungus on the fruit, until the question often arises in our minds whether nature in her planning has assigned us in the Mississippi valley any pears at all! At the best I am forced to the conclusion that the limits of successful pear-growing are very narrow by comparison in our rich western soils and most trying climate, and that, within these limits where success is not altogether denied, we must pursue a very independent system of management.

I have suggested that the conditions of health and longevity are moderate growth and a good holding of foliage. I judge that nearly, if not quite, all of our blight originates in the freezing of unripened or too succulent wood. This state of the wood results mostly from over-cultivation; and it would seem that all stirring of the soil is in some cases excessive. All varieties which cast their leaves prematurely, are liable to a second leaf and wood-growth, which is sure to be unhealthy; while those kinds which hold their foliage well, like Bartlett and Lawrence, will generally make succulent shoots after the normal growth of the tree is completed, if stimulated by much stirring of the soil. I have been able, as I think, to trace most of the original cases of blight I have ever seen to some form of these late growths; and I have myself secured almost entire exemption from it where I have carefully pruned away all this unripe wood in the autumn and winter. But how shall our trees be managed so as to get growth enough for vigor and not too much for healthful maturity, and to keep the leaves

on the trees through the season? This is the great question in pear culture. Any man who can answer it for himself in his own soil, can for himself solve what has proven the most expensive problem in Horticulture. But I feel sure that there can be no universal rules given. It is a question of soils, and climates, and varieties, and of native vigor of trees. I have seen in the valley of the Illinois River, Flemish Beauty trees some twenty-five years old, standing on a ridge of sand of great depth—standing in grass kept short, and said never to have had manure or cultivation—which answered to my ideal of a perfect tree in wood, leaves, and fruit. But in one instance only have I ever seen Flemish Beauty trees hold their foliage and ripen their fruit perfectly on the hills of Southern Illinois, whatever the treatment given. And I recall several dozen very noble and healthy Tysons some fifteen years old, and loaded with fruit, which were standing in a heavy, flat, retentive clay soil in Southern Ohio—seeded to clover; but similar treatment of the Tyson in lighter and better soils in Egypt fails to hold the leaves. And I noted, in that same stiff Ohio soil, some great Bartletts, models of beauty, health, and fruitfulness, growing in a chicken and hog-yard, and so subject to the most stimulating of manures. Any gentleman who has so cultivated in Illinois will please tell us how long his trees lasted.

The able editor of the *Gardener's Monthly* has repeatedly advocated the keeping of pear trees in a close grass sod, and has received much severe, not to say mean, criticism therefor. But while I believe that this method can not be adopted without due regard to local circumstances, yet I am quite clear that it is a far safer general recommendation to make, than the system of generous culture commonly accepted as orthodox; and I believe that the more carefully we study pear trees over any large extent of country, the less we shall abuse Mr. Meehan. The fact that most of the old pear trees in the West are standing, or have generally been kept in grass, is worthy of regard. And the observation that we have all, I think, often made in visiting pear orchards, that the few trees standing on the lawn, or in some neglected corner with unstirred soil, have escaped blight, while the ranks of the cultivated orchard have been sadly thinned thereby, is full of suggestions unfavorable to the commonly received theory.

The system of root-pruning, as so often presented by our earnest and eminent co-laborer, Dr. Hull, has received all the investigation it has been possible for your committee to make, and with conclusions in some cases exceedingly favorable. It is much to be regretted that this experiment has been made by so few men in so few soils. All of us who have repeatedly visited Dr. Hull's orchard, know that his trees and fruit fully sustain the claims of his theory, for his own locality. The root-pruned trees grow very little, hold their foliage well, do not blight, and bear abundant crops of highly-colored and well flavored fruit. I can also report that an orchard of his, six years old, on the same soil, which had not been root-pruned, commenced to blight last year, and badly this year by the 20th of May. They were root-pruned soon after and the blight

seemed to be arrested for the year. I also found this system extensively carried out in one of the largest, and by far the most valuable orchard, in the neighborhood of Alton. Here our friend Hyde has root-pruned several thousand trees and has apparently arrested the blight that was threatening the entire destruction of the orchard when he commenced it five years ago. It is proper to add that our energetic friend is one of the very few men I have found who have faith in pear-growing as a remunerating enterprise. Justice to all the systems under discussion, requires me to say here, that the largest pear orchard in the Alton district (as I am told), which greatly interested your committee three years ago, was this year found most disastrously blighted. Very few trees were found, in all this large and otherwise beautiful orchard, which were wholly free from the disease. Dwarfs and standards were alike fatally affected; but the varieties the least so were the Seckel and Duchesse d'Angóuleme. This orchard had been cultivated in a careful manner until two or three years ago, and has since been in grass and clover.

While I believe that root-pruning may be very profitably adopted by many growers, especially in the vicinity of Alton, where the blight seems alarmingly severe under all other kinds of management, yet I am reluctantly compelled to say that it is not, apparently, as efficacious in all places. A large orchard of nine year old trees, mostly Bartletts, near Cobden, was last spring root-pruned very faithfully and severely, as I believe, in hope of stopping the blight which had increased for several years; but without having any such result. The trees made a very small growth in many cases, and in other trees it averaged a foot or more. The blight in this case appeared not to distinguish the difference. A small orchard at Benton Harbor, Michigan, standing on a sandy bluff, was last spring very thoroughly root-pruned, and mulched but not cultivated afterwards, and while no blight was manifested, I think that few observers of this orchard would be tempted thereby to go and do likewise. And while I do not consider this a fair test of the system, yet the extreme debility of these trees suggests caution as to soil and other conditions which should modify very rigid rules. In fact the rules found to be precisely adapted to the loess soils of Alton are likely to require essential changes in other localities.

I have found less blight in the neighborhood of Villa Ridge than in any other where pear trees are extensively cultivated; and this is directly traceable to the fact the trees in that soil retain their foliage in a very healthy condition. In fact I have never seen any locality where so many varieties of trees exhibited so great a luxuriance of growth with so little manifestation of disease. And I was much impressed with the appearance of an orchard growing in the Ohio bottom, some three miles from the river, and scarcely beyond the reach of high water, the roots evidently penetrating below the high water line, which gave every evidence of perfect health and great vigor. No blight had ever appeared in any variety, although the oldest trees had been twelve years planted. But all kinds held their leaves late in the season: it being remarked that the Sheldon was somewhat faulty, casting its foliage in October.

I presume it is understood that the kind of blight referred to in these remarks is the *frozen sap blight*, and not the kind wholly pertaining to the small branches, said to be caused by the *Scolytus pyri* insect, of whose work I have little knowledge. But our neighbors in Missouri are reported as suffering badly from this last variety, which is there manifested in a very alarming manner, according to the eminent horticultural editor of an influential New York newspaper. A gentleman writes from that unfortunate country, describing a kind of blight, which not only kills this year's and last year's wood, but often "involves the whole tree," and which "severe pruning done in May and the first of June" not only failed to check, but fatally aggravated. This would look like the work of our old and familiar enemy, did not the authority above acknowledged tell us it was caused by a small insect which "girdles the branches." And to another unlucky gentleman whose apple trees have been "cultivated each year since planted, and have grown rapidly," but which are now described as having "the bark cracked through from six inches to a foot from the ground," and "loosened, some part of the way round, and some all round, and dying," he says that "this appears from the description to be the work of insect blight;" and he relieves the afflicted correspondent, and all of us, with this remedy: "Cut off the diseased part," (the entire trees were dying, you remember,) "and insert some cions in the large branches next spring!" Any western gentleman suffering from horticultural disease will be likely to get the proper remedy by applying to any of the New York newspapers.

I am not prepared to recommend everybody to root-prune their trees, or to seed their orchards to grass, but each of these courses will doubtless be valuable in many localities; and my impression is that either will essentially subserve the same end, viz: a moderate annual growth, an early maturity of wood, a better holding of the leaves, and a much finer coloring of the fruit, all of which show a healthier balance of the forces of the tree. Root-pruning demands very thorough cultivation, which renders it somewhat impracticable on our washing hill-sides, but on ground not subject to wash, it may, in many cases, be better than grassing, while a clean sod will be the most cheaply managed, and will save our hill soils from waste. Either plan commends itself to my judgment as far safer for western growers than the high culture, which so well befits the lean granite soils of New England.

In my observation of pear-growing, no fact has impressed me more forcibly than the wide difference in the constitutional vigor of varieties. Our standard pomological books, and the bulky catalogues of our great nurseries, coolly count up the varying virtues of many hundred kinds, and tempt us to buy and plant them; and, indeed, there are a couple of hundred sorts, each one of which possesses some individual excellence, some charm for the eye or the palate, without which a fascinated pear amateur will feel hungry, impoverished, and continually defrauded of his birthright. So let us bravely plant all that are large and showy, all that are graceful in form, all that are beautiful in color, and all the varieties of marked and delicious flavor, that each season of the year

may crown our tables, in qualities to please every taste, with the fairest and most delightful of fruits! Shall we not soon begin to wish that we lived at Rochester or Boston, as our cherished trees, with the most sonorous names and the rarest excellences, rapidly perish in our merciless winters, and we learn a lesson not set down in the books, that nine out of ten of all these varieties are only exotic in a western climate? My friends, I speak from the sadness of experience. I have tried the two hundred kinds, and more, and am now ready to divide that ambitious number by twenty, and then subtract some, to find the list I would advise a friend to plant.

The conditions which restrict us to a few varieties differ materially in the many different soils and climates of our State, but I am acquainted with no locality where many dozen kinds have proved successful. In the north this limitation consists mainly in the tenderness of trees in winter; in the south this is combined with premature defoliation. I judge that the Flemish Beauty has proved the most generally hardy in the north, although it blights badly, and that it and the Bartlett have given the greatest satisfaction in crops; but the Flemish Beauty entirely fails in health of foliage in most places in the south, and it is rare to find a crop perfectly ripened on any tree. Still it often bears immense crops, which in some cases have yielded more profit, to the tree, than any other sort, and it is very widely, if not largely planted. The Bartlett is not reliably hardy either north or south, but its great merits of tree and fruit overbalance all its faults, and it is pre-eminently *the* pear of the State, as of the whole country. For average weight of crops and prices, it considerably surpasses any other variety. All markets prefer it, and if we could have it in ripening from June till January, most men's pear lists would be reduced to this one variety. Indeed, with some planters all considerations of season have yielded to the Bartlett passion, and they are likely to meet the views of those Chicago dealers who declare there are but two kinds of pears, "Bartlett pears" and "Pears," and they say the last variety don't amount to much!

The Howell is better known in the south than in the north. I have not often seen it north of Alton, but it is well worthy of wide planting, for while it may fail oftener than some others from too early blooming, yet its vigorous and hardy habit as a tree, with the superb nature of its fruit, should place it in every list. I find the Belle Lucrative extensively planted, and apparently well adapted to the climate everywhere. It is one of our most prolific bearers, and has few equals in quality, and it is one of the three or four best in respect to health of foliage; in fact I sometimes think it stands at the head of the list in this important particular. But its color on rich soils is a dull unsalable green, while on poor land it often attains perfection of form and most exquisite pencilings of color. This is one of the two varieties I would prefer on quince stocks—the other being the Duchesse d'Angouleme. This last kind possesses great value for market, under favorable circumstances. I find it everywhere regarded as one of the healthiest of trees. It is the one variety which to-day redeems a once very large orchard planted on the

prairies in Southern Illinois from being regarded as a total failure. It rarely blights in the worst soils; it bears young; it is our largest pear, and exhibits a rich golden color when properly ripened. It has sold for higher prices than any other pear, and when in its best estate, it is truly a magnificent fruit in appearance, and scarcely second to the best in flavor. But unluckily it is sometimes insipid in quality under the best of treatment, and always so when allowed to overbear. It is a poor pear for a lazy man. Next to Bartlett and Flemish Beauty, I think it the most largely planted pear in the West. Presented to the public, as it very often is, when two-thirds grown, from overladen trees, perhaps no variety has contributed so much to extinguish a liking for all pears among the swindled consumers.

While pears are among the most cosmopolitan of fruits, yet there are some varieties which seem to posess certain fixed adaptabilities to climate, and develop their best points only under favorable temperatures. The Louise Bonne de Jersey is a conspicuous illustration of this principle. It grows to entire perfection in the Channel Islands; it does well in the marine climate of New England, and is still a good pear at many points farther west, but it loses quality as it goes south, both in tree and fruit, generally becoming coarse and astringent in Southern Illinois. At Cobden it has suffered badly in our last two winters, and it loses its leaves early in most locations. I have known it hold its foliage well in two or three cases in grass, or grown in a shaded spot on the north of buildings; but in the bottoms below Villa Ridge, its foliage is held as well as that of Beurre d'Anjou. Wherever this pear is healthy in habit of tree and free from astringency in fruit, it should be largely grown, for it gets a very salable color, and its flavor is of a positive, aromatic, excellent quality. The Vicar of Winkfield is another important instance of degeneration by moving to lower latitudes. It was once ranked as first among Massachusetts pears, and still holds high position there; but it loses its good quality in its emigration to the West and southward, until it has very little of that article left on the hills of Egypt, and is said to be quite inedible in the Gulf States. And yet I would not wholly discard the Vicar in Illinois. It blights sadly in many places to be sure, but where it can be kept healthy it will yield grand crops of robust, fair-formed fruit. The Vicar has its own place to fill. It is generally good to bake, to stew, to pickle; but it will prove more valuable as a market fruit. It should be grown to sell in those markets which prefer the Pennock and Ben Davis apples, or to the good people who buy the California grade of pears.

The Seckel and Lawrence are examples of the reverse action of this effect of climate. Each of these pears is the standard of excellence in its season at the North and East; and they both improve in size and flavor as they move southward. The walnut-sized Seckels of the New York market, or of Michigan and Northern Illinois, are all little mouthfuls of delicious sweetness; while those grown at Alton, about St. Louis, and in lower Egypt, have some three times the weight, and a positive improvement in flavor; and my information is, that the further south they go,

the bigger and better they grow. So the Lawrences of the Hudson River, Rochester, and Waukegan, are a fair and excellent fruit, but several opportunities of comparison enable me to say that, they average much larger and of finer flavor grown along the Mississippi bluffs and at Cobden; while in middle Georgia, they are reported as often weighing a pound a piece, and without any falling off in their high quality. I am not sure that either of these pears will ever be as profitable for market as the Bartlett and other large pears; for that vicious public taste that prefers simple bigness and color to inside qualities, must largely guide all planting for commercial profit. And as neither of these pears grow very large in our State, and are too good by half to please the taste of the demoralized people who buy California pears, rather than something good to eat for one's self, and fit to give to one's wife, I would suggest a cautious planting of them for market purposes.

There are several other varieties which should receive some mention from me for their merits or demerits—mostly the latter—as they are kept very prominently before the public, but space forbids more than a hasty remark. The Beurre d'Anjou is a pear I think highly of, so far, but I have never yet seen full crops from it anywere, and prefer waiting until I do before commending it to planters. The Sheldon is a high flavored fruit, and its rich bronze color will attract buyers. It is a fine growing tree, but with me is not an early bearer, and don't hold its leaves very well. The Beurre Bosc and Beurre Clairgeau have great beauty of appearance, but as they do not often "put in an appearance" in our markets or even on our exhibition tables, I would not invest in them largely. With me they are among the most tender and faulty of trees, and I have ceased hoping that I shall ever grow the fruit. The Beurre Easter is a very desirable pear to grow where it will ripen, as its fruit is first-class in flavor, and keeps till spring; but it probably wont ripen very far north.

I have not named any pear ripening earlier than the Bartlett. I am not satisfied that there is any early variety worthy of much praise. I have for years sought for such a pear for my own planting, and have not yet decided what to plant. There are several kinds which show a little local value, but I have not yet found the variety that will pay as much profit as the Bartlett over any large area of country. I think the Madeleine must be given up altogether. It is about the worst tree in the list to blight, and the fruit cracks badly. The finest orchard of it I have ever seen was at Centralia, two years ago. To-day, there is not one tree left alive. Doyenne d'Ete is a little less hopeless as yet, but the tree is among the most tender I know, and the pears are not often measured by the bushel. Dearborn's Seedling is too small, and the tree is bad. Rostiezer is better for growing fishing rods than pears; and it is not of much importance that we can't get the fruit, good as it is, as the little copper-colored things wouldn't sell. Tyson is a delightful pear, but a middle-aged man, yet unmarried, shouldn't plant it for family use. Beurre Giffard is a good pear and a beauty, but it rots quick, and the tree is a provoking grower; I don't think it will ever get nick-named

"Dollars and Cents." Clapp's Favorite has the faults of Flemish Beauty in casting its leaves, and in premature decay of fruit, but it is a noble looking pear, and worth hoping about, for a while yet. The Ott I have never fruited, and have seen little of, but I like the tree better than any of the others. On the whole, I think I will plant a few more Bartletts for early pears.

As most men conclude to substitute the Bartlett for all the early kinds, so they, many of them, decide to replace with it all the later ones. The sum of the opinions I have gathered, is, that it pays best of all, notwithstanding the competition of peaches and other fruits, during its season. Possibly they may be nearly right, if the Bartlett can be successfully kept in fruit-houses through the autumn months. This has been done for several years past, in New York and elsewhere, and it will certainly be better than to depend on the old favorite kinds, like the Beurre Diel, Winter Nelis, and Glout Morceau.

The question of the future market for our pears is an important one. I have been watching the influence of the California pears on our markets, with much interest, and with rather discouraging conclusions. In fact as I have looked abroad over our beautiful orchards, blackened by blight, or standing naked in mid-summer from defoliation, or passing through the destructive vicisitudes of our interior climate, or have heard the ever-increasing hum of the myriad insect hosts which envelope them, I have sometimes nearly reached the conclusion, that California is the most promising land for growing pears for Illinois markets. The farmers of the Pacific States grow pears about as cheaply as we do acorns, and with greater certainty of crop, for severe freezes never occur, and insects and funguses are almost unknown. They ship them to Chicago at rates only equaling the express tariffs from Southern Illinois, and sell them for nearly double the prices which we get, pound for pound. It is evident that they are better paid than we are. It is true their pears are far inferior to ours in flavor—especially the later ones; but many of them are very beautiful, and we must expect them to sell, regardless of quality—as long at least as this Society recommends the planting of the poorest apples on the list, because they have good looks and will sell. Then as I think it costs the California growers less money to set down a bushel of pears in Chicago, than it does us, all the conditions of growing the crop, as well as transportation expenses being counted, I think it is a very serious question whether we can make pear-growing in Illinois a tempting financial success, in competition with the immense advantages enjoyed by those lucky dwellers along the Golden Coast.

PARKER EARLE.

At the conclusion of the reading of Mr. Earle's report, it was voted to devote twenty minutes, to-morrow morning, to a discussion of some of its topics, also, that in such discussion, each speaker shall be allowed no more than three minutes, except by unanimous consent of members present.

On motion, adjourned.

THURSDAY MORNING.

The Society met pursuant to adjournment.

President FLAGG called the meeting to order.

The exercises were opened with prayer by Prof. T. J. Burrill, of the State Industrial University.

Mr. PORTER presented the following resolution:

Resolved, That this Society encourage the teaching and study of Horticulture in our high schools, colleges, and seminaries, and that a committee of three be appointed by the chair to prepare an address showing the benefits that would result from a practical knowledge of Horticulture, and to publish the same in all the public journals in the State whose proprietors will give it a gratuitous insertion.

On motion, this resolution was referred to a special committee of three, consisting of Messrs. J. S. McClelland, J. E. Porter, and Smiley Shepherd.

The special order of business for twenty minutes of the morning session, viz: discussion on Mr. Earle's report, was then taken up.

Mr. TALLON, of Burlington, Iowa, being asked to give his experience in growing pears, said that he has grown pears since 1847; has had good success. His trees are dwarfs, not planted deep enough to allow the pear graft to take root. His trees are in grass, which he top-dresses with manure in the fall and with ashes in the spring; had some blight in his orchard previous to 1864, but none since. The practice of top-dressing his orchard begun at that time; has about two hundred varieties and has been successful with nearly all, but would especially recommend Grey Doyenne, White Doyenne, and a variety called "Pennsylvania." This last sort has never blighted, and he has had no trouble with the, so called, tender varieties.

Mr. SHAW called the attention of the Society to a pear orchard in Lewiston which had been mulched with saw dust with success; also mentioned another orchard in which mulching had proved successful. Both orchards consisted of standard trees.

Mr. BRACKETT, of Lee County, Iowa, said that the White Doyenne, concerning which so much complaint has been made, had never cracked, with him. Louise Bonne de Jersey has been very successful.

Mr. SNEDECKER—I have trees of the Seckel pear, thirty years old, which have never blighted.

Mr. BIRD, of Mt. Pleasant, Iowa, has cultivated pear trees for fifteen years; manures in the fall on surface of ground, and forks in the manure in spring. Most varieties have blighted badly; has a White Doyenne that has never blighted. The Flemish Beauty is one of the very best.

The President announced that the time allotted to this discussion had expired.

THE AUDITING COMMITTEE

submitted the following report:

Gentlemen of the Society:

Having examined the accounts placed in the hands of this Committee, we would report that we find everything in them correct.

We can not let this opportunity pass without commending the extreme economy of our Secretary.

S. G. MINKLER,
H. J. HYDE,
LEWIS ELLSWORTH,
Committee.

The report was adopted.

Also the following was presented:

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

The Committee to whom the address of the President was referred, respectfully report that in their examination of it they have confined themselves to that part which was read to the Society. The remaining portion, which was but hastily looked over by them, consists of an able, and somewhat elaborate discussion of the subject of "The Province of Horticulture," which they hope the author will find time and opportunity to read before the close of the meeting.

The first matter of interest mentioned in the address is the financial condition of the Society, showing the necessity of economy in our expenditures.

Your Committee approve the recommendation to apply to the legislature for an increase of our annual appropriation to $3,000, which sum would enable us to carry forward our work with greater efficiency.

The purchase by the State, of the entomological collection of our departed friend, Mr. Walsh, and the appointment of so competent a person as Dr. Le Baron to the office of State Entomologist, made vacant by the death of Mr. Walsh, are matters of satisfaction and congratulation.

The importance and value of stations in different parts of the State for agricultural and horticultural experiments, will not be questioned by any one.

Your Committee think that these stations should be under the charge, and their management a part of the work, of our Industrial University.

Whether the present is a favorable time for pressing this matter upon the attention of our General Assembly may be doubtful, but it is certainly none too soon to call public attention to it.

Your Committee entirely agree with the President, that sound public policy and forecasting statesmanship demand that we shall do all we can to encourage the planting and growing of timber trees on the prairies, and concur in the recommendation that a committee be appointed to bring the matter before the Society and the General Assem-

bly, in such a manner as to secure favorable legislation in relation to it. They ask the adoption of the following resolution:

Resolved, That a committee of three be appointed to prepare a bill for the encouragement of tree-planting, reporting it to this meeting, if possible, for discussion; but if not practicable to report at this meeting, it shall be their duty to present the same to the General Assembly, and urge its passage.

The recommendation of the address, that engraved likenesses be procured, of Messrs. Overman, Kennicott, and Harkness, deceased members of this Society, who were distinguished in the earlier periods of our horticultural history, is approved, and we conclude the report with the following resolution, viz:

Resolved, That the Executive Committee be authorized to procure engravings of the likenesses of the three gentlemen mentioned for insertion in the forthcoming volume of Transactions, if, in their opinion, the finances of the Society will justify the expenditure.

A. M. Brown,
T. McWhorter,
E. Daggy,
Committee.

This report was concurred in.

ELECTION OF OFFICERS.

On motion it was ordered that the election should be by ballot, whenever two or more candidates were put in nomination for any office; otherwise, by voice.

The following persons were put in nomination for the several offices, as designated, each one of whom was unanimously elected, viz:

For President—Mr. Douglass nominated

ARTHUR BRYANT.

For Vice-President of First District—Mr. Earle nominated

ROBERT DOUGLASS.

For Vice-President of Second District—Mr. Burrill nominated

SAMUEL EDWARDS.

For Vice-President of Third District—Mr. Mason nominated

A. G. HUMPHREY.

For Vice-President of the Fourth District—Mr. Earle nominated

M. L. DUNLAP.

For Vice-President of the Fifth District—Mr. H. J. Dunlap nominated

J. W. FLETCHER.

For Vice-President of the Sixth District—Mr. Huggins nominated
H. J. HYDE.

For Vice-President of the Seventh District—Mr. Brown nominated
P. R. WRIGHT.

For Secretary—Mr. Starr nominated
O. B. GALUSHA.

For Assistant Secretary—Mr. Brown nominated
H. J. DUNLAP.

For Treasurer—Mr. Minkler nominated
J. HUGGINS.

The next business in order being the selection of a place for the next Annual Meeting,

Mr. FLETCHER, in behalf of the citizens of Centralia, and of the Centralia Fruit-Growers' Association, invited the Society to hold its next meeting at that place.

PROF. TURNER spoke for the Morgan County Horticultural Society, urgently requesting that the next meeting be held at Jacksonville. He said he did not ask the Society there, because the citizens of Morgan county were horticulturally worthy to have the Society go there, but because they needed and craved the light and stimulus which such a meeting would give to their Horticulture.

Mr. BRYANT said that while Jacksonville might be called the Athens of Illinois, in regard to general knowledge, yet, as admitted by Prof. Turner, her citizens were somewhat in *horticultural* darkness; and as the province of this Society is to diffuse light as well as to create it, he would favor going there.

PROF. BURRILL, in behalf of the Illinois Industrial University, invited the Society to go there. He thought it would be well for all horticulturists of the State to see and know what steps are being taken there to secure ultimate good to the horticultural interests of the State. He would not urge that the Society go there for their next meeting, but hoped that if not, it would meet there in 1872.

Mr. EDWARDS spoke in favor of Champaign, urging that there were being inaugurated extensive experiments in Horticulture, which should be examined into by this Society, that the horticultural department of the University would be aided in its work by our presence and our counsels —that the well known hospitality of the citizens of Champaign promises us a cordial welcome. A rising vote was taken upon selecting Jacksonville as the place of holding the next meeting, which resulted in the unanimous choice of that place.

On motion of M. L. DUNLAP, the TIME OF THE NEXT ANNUAL MEETING was fixed for TUESDAY, the TWELFTH DAY of DECEMBER, 1871.

Mr. STARR moved that the examination of new fruits and the distribution of cions be deferred until after the reading of Judge Brown's paper, which was agreed to.

Mr. BROWN then read a paper upon

PACKING FRUIT FOR MARKET.

Our Secretary has assigned me a subject upon which it is difficult to say anything that will be new or valuable. Intelligent horticulturists fully understand the necessity of putting their fruit into market in proper condition, as well as the means by which this is done. That large class of people who fill our markets with unripe, ill-assorted, bruised, and rotting fruit, never read the papers, and our Transactions are not likely to reach them. They will continue to do as they have done to the end of time, in spite of everything that may be said or written on the subject.

However, we have good authority for inflicting "line upon line, and precept upon precept," and whatever may seem trite in what follows, will be excused upon that principle. A reiteration of familiar facts or principles—like the quack doctor's bread pills, will do no harm if it does no good.

It was often said, a few years ago, that it made no difference how fruit was packed, or what was the quality of the fruit itself, for it all, good, bad, and indifferent, brought the same returns to the producers. There was some truth in this, partly because consumers were less careful in making their purchases than they have since come to be, but chiefly for the reason that many commission merchants had the rascally habit of making an average of each day's sales, and returning to all their correspondents precisely the same prices. In this way the careless packer and the producer of poor fruit, came in for an even chance with those who had put their fruit in market in the best condition. But all this has been changed, at least to a considerable extent. Purchasers, now, look pretty sharply to the quality and condition of what they buy, and honest commission men may be found, even in Chicago, who will return to each shipper the price his own fruit sells for. It becomes every year, more and more noticable that, in all our markets, the prices obtained depend upon the quality and condition of the fruit sold, and this quality and condition depend very largely upon the style of packing, especially when it is to be transported long distances by railway. The finest fruit, carelessly put up, will reach the consumer in bad order.

Strawberries.—In our State, at least for distant markets, strawberries are put up in the hollow-bottomed quart boxes with which all are familiar, twenty-four of which, usually, are packed in a case made for the purpose. The berries are picked directly into the boxes, and the essential thing to be attended to is the manner in which this is done. They must be carefully handled to avoid bruising the tender flesh. The

careful picker seizes the stem between the thumb and fore-finger, and pinching it off about half an inch from the fruit, transfers it at once to the box. He will reject all that are too green, or over-ripe, or very small. The careless or uninstructed picker will take hold of the berry, and pull it off, transferring it to the palm of the hand, until he has a handful. The result is that the fruit is more or less bruised, and in a condition for rapid decay. The boxes should be well heaped up, and then carefully set in the case, the top pressing gently upon the top of the berries in the upper tier. Some are in the habit of turning the fruit out of the boxes and assorting it. This is of doubtful value. The additional handling involved probably does more damage than would be occasioned by the over-ripe or imperfect berries taken out. Certainly it is not necessary when you have careful and well-managed pickers.

Raspberries and blackberries are packed for market in the same way, except that the fruit parts from the stems. The same care in handling to prevent bruising is requisite.

Peaches.—No fruit requires more careful management in its preparation for market, than the peach. The flesh is exceedingly tender, easily bruised, and it tends to rapid decay after it is fully ripe. They should be gathered at that particular stage of maturity that immediately precedes softening. They should be ripe, but not mellow, and in order to secure them in this condition the trees must be gone over every day. They must be carefully handled to avoid bruising. The packer takes them, one by one, and places them in the box, being careful to get them as close together as they can be made to lie, and the box must be so well filled that the top will go on with considerable pressure. The object is to confine them so closely that they can not become loose and rattle in the boxes. They should be rigidly assorted, the best specimens going together, and the smaller ones to themselves, to be sold as second-class fruit. The tasteful packer will, of course, so arrange the fruit, with the best side out, etc., as to make it present the best possible appearance when opened.

The package almost universally used in Southern Illinois, is the box, holding about one-third of a bushel. Baskets are not available with our present mode and means of transportation. The box composed of seven pieces is the best, consisting of three heads as they are called, one broad piece for each side and single pieces for the bottom and top. The box made of narrow slats shows the fruit better, but the numerous edges and corners are apt to abrade the skin and cut into the flesh.

Pears.—Early pears, as well as the earliest apples, are usually sent to market in the same kind of box used for peaches, and with these, the essential things to be secured are proper assorting of the fruit and close packing. Later in the season pears are best marketed in larger packages, as bushel boxes, half barrels, or barrels. They ripen best when excluded from the air, and for that reason the vessels should be close. In packing, the bottom of the barrel should be covered by placing the fruit carefully upon it, one at a time, so arranged as to make it show to the best advantage; then pour in, shaking two or three times, briskly, as the fill-

ing progresses; heap the fruit a little and press in the head with a screw or lever. Choice pears are sometimes sent to market wrapped singly in tissue paper, a very good practice as I think. Some dealers in New Orleans prefer to have this fruit come to them packed in soft, dried grass. Some such material must be used unless great care is taken in filling the boxes or barrels so that the fruit can not become loosened by the rough handling it is likely to be subjected to in the course of its transportation to market.

Apples.—Apples, except the very earliest, are invariably sent to market in barrels, holding from two and a half to three bushels each. The bottom is first covered with a course or two laid in, one at a time, with the stems down. The barrel is then filled by pouring in from a basket that can be let down and emptied inside, so as to prevent bruising, shaking well as the filling progresses. The fruit is heaped up as high as the top of the chine, the top laid on, and, by the use of a follower and lever or screw, pressed into its place. The name of the fruit should be plainly marked on the *bottom*, which is the end that should be opened when offered for sale.

Grapes.—Grapes are usually sent to market in light boxes holding from three to ten pounds. The fruit should be spread out in the sun for a few hours, or until the stems have wilted and become limp and yielding. The bunches are then laid in the box as carefully and tastefully as possible, filling up until the top will go on with some pressing. Mark the name of the variety on the *bottom*, which, when in market, becomes the top. These boxes are packed in crates of convenient size.

In marketing all fruits, clean, new packages should be used. After this, the essential things to be attended to, as appears from what has been said before, are careful assorting and close packing. The more tastefully the fruit is arranged the better—appearances go a great way in everything, and especially in the sale of fruit.

M. L. Dunlap thought that the subjects treated in this paper are very important, not only to the producer, but to the consumer. Fruits can not be well packed and reach the market in such condition as to secure the best price, unless they are properly picked and handled. Strawberries and cherries should be picked with their stems left on, to prevent too close pressure in the boxes, and consequent mold and decay.

These and other fruits could be picked and taken to market, riper than they usually are, if proper care were taken in picking and packing. It will pay well to pick carefully and pack well. Careful pickers should be paid more per box than careless ones. Purchasers may know whether the fruit has been well picked and packed. If it has been, the boxes will be full, otherwise not.

Dr. Spalding—The writer recommends exposing grapes to the sun a short time after picking before packing. The practice of grape-growers in the vicinity of St. Louis differs from this.

We take our packages into the vineyard and pick very carefully,

handling as little as is possible in taking out all imperfect berries, placing the bunches directly in the boxes. This is done to preserve the bloom as much as possible, as the bloom gives the fruit an attractive appearance when offered for sale, and fruit upon which it is well preserved commands a higher price than that from which it has been removed in handling. When the boxes, or other packages are a little more than full, we set them in the shade for a few hours, or a day, to shrink a little before fastening them up.

We have no package for grapes which exactly meets our wishes—are looking for something better—we use boxes of different sizes, and baskets.

Mr. Bliss said it was his custom to put apples in heaps to let them sweat before putting into tight barrels for winter. If put in directly from the tree, they would not keep as well. Mellow or ripe apples will not bear much pressing, when heading up the barrels, for if bruised they will decay.

Mr. Spalding—For home use we pack our grapes in boxes with alternate layers of papers, renewing the packing after a time.

Mr. Nolan, of Benton Harbor, Mich., said that he wanted steps taken to secure the regulation of the size of a peach box or basket, by act of the Legislature of this State.

Chicago is the market for nearly all their fruit, and there is found such a difference in the size of packages that it is not possible often to get the honest value of a full one-third bushel basket or box of fruit. He offered the following resolution:

Resolved, That in the opinion of this Society, the size of a peach box or basket should be regulated by law, and that we recommend that the size of such package shall be one-third of a bushel.

The President thought it more difficult to establish uniformity in size, than to provide for the the sale of fruits by weight.

M. L. Dunlap offered the following as a substitute for Mr. Nolan's resolution, viz:

Resolved, That this Society memorialize the General Assembly of this State to pass laws providing for the sale by weight, of all horticultural products hitherto sold by measure,

which was supported.

Prof. Turner moved an amendment to the effect, "that this subject be committed to a committee, to consist of President Flagg and two other members who shall take the matter under advisement and lay it before the next General Assembly."

Mr. Earle was opposed to the resolution of Mr. Nolan, and in favor of the substitute of Mr. Dunlap. He could not consent to place this whole matter in the hands of a committee without first knowing their views respecting it. He regarded it as a matter of great importance, which should have an earnest expression from this Society.

The President had examined this matter carefully. A reform is

needed, but how is the best way to bring it about? Two questions are involved: what is right? and how can we accomplish the right without running counter to a conservative element which we can not overcome if we would?

He had become convinced that the best thing to do was to secure the passage of a law regulating the number of pounds in a bushel of fruit.

The amendment of Prof. Turner was lost.

The question recurring upon the adoption of the substitute of Mr. Dunlap, prevailed.

Mr. J. H. Tice, of St. Louis, a member of the Committee of this Society on Meteorology, then read, by request, a paper which he had prepared upon this subject.

METEOROLOGICAL EFFECTS OF FORESTS.

Mr. President, Ladies, and Gentlemen:

My object is to discuss a subject which has had, and ever will have, an important bearing on human well-being; which in the past has rendered man a fugitive and a vagabond on the face of the earth, and which, in the future, will continue to scourge him, until experience and reason will bring him in harmony with Nature.

This subject is the great law which holds a climatic correlation between moisture and the earth's vesture, and between aridity and its nakedness. The ignorance of this law, or of its non-observance, has, in the past, inflicted an untold amount of misery upon man, and upon its knowledge and observance will depend his future prosperity and happiness. If this can be shown, then, if woe betide him hereafter, he must acknowledge it as a just punishment for his delinquency; and if weal, he will have the consciousness and satisfaction of knowing that it is a reward for his faithfulness and obedience.

As it is impossible to fix man's advent upon the earth, so it were futile to attempt it. All we do know is, that he appeared in the tertiary period, and was cotemporaneous with the primitive horse and mastodon, because stone implements have been found with figures of both engraved upon them. But how long ago that has been—whether ten thousand or ten hundred thousand years, no one can tell or ever will know.

In the time when Northern Europe was yet submerged—when the reindeer roamed over the Alps—man was there, dwelling in caves, and his bones lie mingled with those of the primitive horse, of the reindeer, the mastodon and *bos bifrons*, making it probable that these animals served him for food.

But in the progress of time, either from increase in intelligence, or of numbers, he forsook the caves and built for himself dwellings consisting of four large stones for the sides and one for a cover. This is called in archæology, the megalithic, that is the big stone age. These houses, buried in the soil, are found from the British Isle to farthest India, and south to the Cape of Good Hope. Evidently these structures were co-extensive with the human race at that period.

In the megalithic age, man became, if he was not before, a terraculturist; for petrified heads of wheat, rye, and barley are found buried with these houses in swampy places; hence it is probable at this period commences the date of his reactionary agency upon climate. To raise the cereals, and to find pasture for his flocks, he had to clear away the primitive forests, and it was impossible for him to have denuded large areas of land without observing the consequent climatic changes.

No facts exist to furnish us with the least clue for measuring the length of the duration of this age, but probably it extended over thousands of years. Be its length what it may, the whole of it was a pupilage of the primitive man in the school of experience, teaching him many lessons that he will never forget. Amongst these lessons unquestionably was this, that the destruction of forests smote climate with aridity, and consequently the earth with sterility. As he could not penetrate to the cause of this, his unsophisticated mind attributed these changes to the wrath of the gods. But why to the wrath of the gods? What had offended them? While the primitive forests remained, the gods were propitious; the rains descended copiously, springs welled up, and the rivers flowed. The earth also was clothed with verdure and teemed with bountiful harvests; the forests were filled with game, and the waters with fish. But when the forests were gone, the rain ceased, the fountains and rivers dried up; the earth was parched and became an inhospitable desert; the tenants of the wood perished or fled, and the fish disappeared with the streams. Surely if calamities so great were not evidences that the gods were offended, what could be received as such? But what was the cause of the offense?

What so lovely as the grove, and what so transcendently beautiful as the forest, under whose shady canopy is collected everything that is pleasant to the eye or grateful to the senses? There the waters gush up to the sun, sparkle in the light, and murmur as they run. There nature's orchestra is never silent, but music mingling in symphonious harmony from high alto to deep bass forever floats in the air. There gaudy insects disport themselves in the sunbeam; and there the shepherd seeks shelter from the heats of summer, the colds of winter, and repose for himself and his flocks. There roam the graceful deer and fleet antelope in freedom, and also the fierce leopard, the panther, the tiger, and the lion. Surely, if the gods dwell anywhere upon earth, or even have a temporary sojourn here, it must be in the groves and the forests? So reasoned the primitive man. Hence not only his inference that war upon the forests was war upon the gods, but also if man wished to draw near to the gods and hold communion with them, he had to go to the groves, their dwelling place, and there pay his adorations and prefer his supplications.

So evidently was this the process of his reasoning, that its impress is indelibly stamped on all the ancient religions. Druid, Roman, Greek, Heathen, and Hebrew, however widely different were the gods they adored, they had one thing in common in which they all were in accord, that of worshiping God in the groves. Abraham planted a grove in Mamre, and there called upon God. Moses and Joshua, feeling that this

then universal sentiment would lead the Israelites back to idolatry, enjoined upon them to hew down and burn the groves of Palestine, for there, they say, the Canaanites worshipped false gods. Too faithfully did the Israelites carry out this injunction, and Palestine, instead of a land flowing with milk and honey, has become treeless, herbless, and almost a desert. The early, that is the winter rain, yet comes in its season, but the latter, the spring rain, no longer visits the naked plains.

The ancient legends and myths of Greece and of Rome, had we no historical evidence of it, show not only that worshiping in the groves was universal, but also the reason for it. It is a historical fact that the ancient Pelasgic oracle of Dodona was situated in a sacred grove. So also the Greek oracle at Delphi. But what is remarkable in this latter case, is, that the cave whence issued the prophetic vapors that inspired the Pythia, was situated in a sacred grove where the responses of the oracle alone were delivered. In that magnificent poem, "The Forest Hymn," Bryant, the most emotional of American poets, has beautifully described this universal custom of the ancients:

> "The groves were God's first temples. Ere man learned
> To hew the shaft and lay the architrave
> And spread the roof above them, ere he framed
> The lofty vault to gather and roll back
> The sound of anthems, in the darkling wood
> Amidst the cool and silence, he knelt down
> And offered to the Mightiest solemn thanks
> And supplications."

The religious sentiment that the groves were the natural temples of the gods, necessarily carried with it the corollary that they were sacred, and consequently the act of destroying them sacrilegious. Hence, Virgil relates how Æneas, being obliged to obtain timber from the groves of Mount Ida to build his fleet with which to flee from Troy to Italy, durst not do it until he had obtained permission from Cybele, to whom they were dedicated. In fact the ancient priesthood, which represented almost exclusively the intelligence of the primeval world, to preserve the groves and forests, dedicated them to some deity, and inculcated the dogma that he who destroyed them, was guilty of sacrilege and would be punished by the offended god. A few myths and legends will suffice to make this evident, and also the reason for inculcating it.

According to an ancient myth, Erisichton derided Ceres and cut down her groves. This impiety so irritated the goddess, that she afflicted him with continual hunger. He sacrificed all his possessions to satisfy the cravings of his appetite, and finally devoured himself for want of food. According to the ancients not only the groves were sacred, but each tree had a nymph called Hamadryad, that cared for and protected it. Moreover, the fate of these nymphs had a dependence on their trees, and they lived and died together. Apollonius relates a beautiful legend illustrating this point, and incidentally the belief that trees and moisture are concomitants. He says, "Rhaecus, observing an old oak ready to fall,

ordered his servants to set it upright again, and put fresh earth and manure around its roots. The Hamadryad, who must necessarily have perished with the tree, grateful for what he had done, appeared to him to thank him, offering at the same time to grant any favor he might ask. He replied, the act was one of piety, and the consciousness of having performed his duty, was ample reward to him. She then promised to bless him with continued prosperity, that his fields should teem with abundant harvests, and his flock increase a hundred fold, which accordingly came to pass. But in the lapse of time a severe adverse calamity befel him. Thinking that the Hamadryad had violated her promise, to avenge himself he cut down the oak. Immediately he was paralyzed and rendered helpless, his fountains no longer sent forth water, his streams dried up, his lands, parched by drought, were sterile, and he finally perished with hunger."

This must suffice as evidence that in the earlier ages, ere history or even tradition was born, man had learned an important lesson, which if he had reduced to practice, the aspect of the globe and the distribution of mankind would have been far different than what they now are. The waters of the Dead Sea would still flow in to the Gulf of Suez; the river whose dry bed was traced by Belzoni through the centre of the Great Sahara, and which is called by the Arabs "the river without any water," would still bring its tribute to the Mediterranean. The plains of Assyria and Babylon would still be the seats of opulence, population, and power; Sahara, Gobi, and other deserts would find neither name nor location on our maps; and Spain, Palestine, Egypt, and other arid and sterile regions would still be the granaries of the world.

There have been received certain sayings, as though they embodied unquestionable historical truths; for instance, that the children of Adam followed the Sun, and that "Westward the Star of Empire takes its way." Some have gone so far as to suppose that innate instinct determined this assumed course in man. Like many other dogmas, accepted as true without investigation, these sayings will not stand the ordeal of close scrutiny. The migrations of the Toltecs and Aztecs, on our own continent, have been from north to south, while those of the Egyptians have been the reverse, from south to north. It is only true of the Asiatics and Europeans that they migrate from east to west. Philosophically, therefore, no innate law of humanity is even supposable as presiding over, and directing these migrations.

The direction of human migrations is not determined by an inherent law; for, if it were, it would be as irreversible as solar and planetary motion. It receives its entire impulse from a necessity imposed by man's own agency. The edge of a forest being set on fire, the consuming element travels necessarily in the direction not yet wasted by it. So it is with man. He is a waster of forests, and hence in his migrations he follows the receding forests, whether they lie north, east, south, or west.

While man remained a savage, and lived by the chase, forests not only supplied his simple wants, but also afforded him shelter alike against the scorching heats of summer and chilling blasts of winter.

But when he emerged from the savage state and became a terra-culturist, trees had to give place to the cereals, grasses, etc. From that day the forests receded and disappeared before the advance of man, and the degradation of climate commenced. Why? Because, not knowing the great law of compensation, that forests hold climate in a medium equipose between opposite extremes, he destroyed them and brought on aridity and sterility. Practically his advance was like that of fire through a forest, exuberant fertility in front, and desolation in the rear.

If we examine the legends of ancient migrations, or the facts that authentic history furnishes of such, this is the only explanation that accounts for both, presenting them logically in the category of cause and effect. Let us see. Erosions on the cliffs, high above the waters of Salt Lake as at present, show that the lake formerly, must have been deeper, covered a larger area, and consequently must have received more water than now. Fossilized wood found all over the now treeless and almost herbless plains of the Great Basin, show that formerly it must have been a well timbered country. Indications are also abundant that it was once densely populated by a primitive race. South, on the San Juan River, immense ruins of ancient cities have recently been discovered; and further south, on the Rio Colorado Chiquito west of Zuni, are the well-known ruins of the seven cities of Cibola. All the region drained by the Colorado is covered by the ruins of ancient cities, and must have been densely populated, and therefore must not have been, as now, a treeless, arid desert. Great climatic changes must, therefore, have taken place to have converted this once populous region into an inhospitable desert. What causes were in operation to produce this effect? The legends, both of the Toltecs and the Aztecs of the valley of Mexico, point to the Great basin, and the plains of the Colorado, as the ancient abode of their ancestors, whence they emigrated to Mexico. We are justified in the inference that necessity compelled their migration, and that they fled from the desert, a curse they had brought upon the land and themselves. This inference gains strength when we look into the civil polity of those nations relating to forests, whence we infer that they had learned a severe lesson by experience, namely, the cause that necessitated their migration. Prescott, in his History of the Conquest of Mexico, informs us that both the Tezcucans and the Aztecs had severe laws against the wasting of forests. No one was permitted to gather wood except what was fallen down, nor to cut timber without leave from foresters appointed by the king.

Historically, we know that Egyptian migration was down the valley of the Nile, that is from south to north. Egpyt's first capital was Meroe, in Nubia. Herodotus informs us that all the ancient traditions agreed that at that time the valley of the Nile was covered with dense forests and extensive marshes. Within the present century the truth of these traditions has been verified by French savans, who exhumed at all points petrified trees and stumps. No other explanation is possible, except by the hypothesis that they grew where they are found buried, and that the entire valley was once covered with dense forests. Belzoni, in 1817,

found the bed of an ancient river far out in the desert, near the oasis where once stood the famous temple of Jupiter Ammon. The Arabs called it "the river without any water." Belzoni, in tracing its bed, found what was once an island covered with immense petrified stumps. Some distance from Cairo, but out in the desert, is now to be seen a petrified forest. These and other evidences show that Egypt, and at least a great part of the Sahara, were once covered with forests. Now, since a search of the entire surface of the earth will not reveal such an anomaly as trees without rain, therefore the inference is irresistible that Egypt and the Great Sahara were not formerly as now, rainless. As the trees have disappeared by human agency, man is responsible for the climatic changes effected. Egyptian cultivation in ancient times, we know, extended far into regions now covered with the sands of the desert. The cause of the degradation of the climate, it is now admitted by the Egyptians themselves, was that before the march of man down the valley of the Nile, the primeval forests disappeared until not even a representative tree was left.

It is most true, that in Egypt civilization came down the valley of the Nile, but it is not the whole truth. Civilization in the past, like many other benefits, has not been an unmixed blessing. Egyptian civilization, like the Eastern civilization in Asia and Europe, and like the Toltec and Aztec civilization on our own continent, left desolation in its rear.

The successive removals of the capitals of ancient Egypt, first at Meroe, next at Thebes, and finally at Memphis, were necessitated by the utter desolation caused by the encroachments of the deserts that successively overtook them. So overwhelming and complete was the triumph of desolation, that the very sites of these capitals became mooted questions; and the exact localities of Meroe and Memphis (both now in the desert), have only been determined by researches made within the present century.

The most ancient traditions and Scripture place man's origin in Eastern Asia, where he was surrounded by an exuberant vegetation, and consequently where the animal kingdom abounded in immense numbers, and in innumerable forms. How long he lived upon the fruits of trees, upon fish, the chase, and other bounties of nature, and how widely he became dispersed before necessity forced terra-culture upon him, it were futile to inquire, as neither tradition nor history informs us. Moses informs us that, after the transgression, man was sent forth to till the ground; and also that cherubim with a flaming sword were placed east, which turned every way to guard the tree of life. The sending him forth from the garden of Eden to till the ground, may dimly shadow forth the great change in his physical condition when he ceased to be a beneficiary on nature's bounty, and was doomed in the sweat of his face to eat his bread all the days of his life. The flaming sword also may symbolize the scorching desert he had placed between himself and his last Eden, since Hagi Ismael describes a desert "as a place where the earth is of fire, and the wind a flame." Be this as it may, he turned his face to the

primitive forests of the West, which disappeared at his approach and desolation followed in his rear. The present arid, desolate condition of Persia, Afghanistan, Beloochistan, Mesopotamia, Syria, etc., countries famous in history for their fertility, population, power, wealth, science, and refinement, shows that great climatic changes have taken place. Now these changes must either have been wrought by human agency, or by astronomical causes. If by the latter, then it must have been by a physical change in the constitution of the Sun; as he is the great vivifier not only of the Earth but of the universe. He not only sets in motion the mainsprings of plant and animal life, but with irresistible power and majestic grandeur he hurls our globe and planets with inconceivable velocity around him through space. Whatever of motion there is on the earth, in the ocean, the air, or in the solar system, emanates from the energy of the sun. We know planetary motions are not only uniform but invariable, not having changed or deviated even a fractional part of a second since the days of Hipparchus, the first observer, two thousand two hundred years ago. Hence the energy producing them must be constant, uniform, and invariable also. The annual mean of all physical phenomena, hygrometric, meteorologic, electric, magnetic, thermal, etc., are also physical constants. It were therefore futile to look for the cause of climatic changes within the historical period, to astronomical changes. Our only alternative then is to refer them to human agency. Especially are we justified in so doing when all admit that the natural operation of known physical laws is such as to work these changes under proper conditions; and that the operations of man can and do produce those conditions. Let us see how this is.

About three tenths of the earth's surface is land, the remaining seven tenths being water. As the average annual energy of the sun is a physical constant, so the annual average of water vaporized from the ocean, and consequently the annual average of rain precipitated must be physical constants also. Neither the area nor the physical condition of the water surface of the earth has changed within the memory of man. Hence, neither has the reaction of the ocean upon the atmosphere changed within that time. Then, consequently, as far as rainfalls on the ocean are concerned, other things being equal, the amount of rain on the water surface must not have changed either. But how is it with the land surface of the earth? In Europe, Asia, and Africa, where thousands of years ago were impenetrable forests, there are now treeless and desolate plains. The condition of the land surface of the earth being different now than formerly, its reaction upon the atmosphere must also be different. In respect to rain and drought, this reaction is as follows. Rain only falls from an atmosphere that is cooling after taking up and holding vapor in suspension at a higher temperature. Volumes of air nearly filled to saturation with vapor, are constantly drifting over surfaces of lower as well as higher temperature. Those drifting over surfaces of lower temperature become cooled, clouds form over, and rain falls on such cool surfaces. Now, which are the cooler, surfaces clothed with vegetation,

especially with trees, or barren naked plains? Even dumb animals know, for they fly from the scorching rays of the sun in the open fields, to the grateful cooling shades of the forest. While, therefore, the great physical law remains in force, that rain can only fall from a cooling atmosphere, and as long as it is a physical fact that the shade is cooler than the sunshine, so long must the amount of rainfall on timbered countries be greater than that on naked plains.

Precipitation depends on saturation, and saturation upon temperature. Generally, while the temperature of the air is rising, saturation can not take place; but when it is falling, the point of saturation is reached at some time, and rain begins to fall and continues to fall as long as the temperature descends. Careful experiments show that air at the temperature of 32 degrees Fahrenheit, when saturated, holds 1-160 part of its volume of aqueous vapor in suspension. At 59 degrees, it is saturated by 1-80 part of its volume; and at 86 degrees, by 1-40 part of its volume of vapor. Hence, every time the temperature of the air is raised 27 degrees Fahrenheit, its capacity to absorb and hold vapor in suspension is doubled. Therefore, air saturated at 86 degrees holds in suspension four times the quantity of water as when saturated at 32 degrees.

We have seen that forests are cooler during the heats of summer than open fields or naked plains; consequently there must be a difference in the temperature of their respective superincumbent atmospheres. If the vapor be equally distributed in their respective atmospheres, then that over the forest is nearer the point of saturation than that over the adjacent plains; and when that over the forest is saturated, that over the adjacent plain is not so by the ratio of the difference between their respective temperatures. But during the day the sun's rays increase this difference, movements of air set in, and the general temperature of the whole atmosphere is raised. Thus still greater quantities of vapor are taken up and held in suspension. This process may go on for days and weeks, and even months, until saturation at a high temperature is attained—then a reaction sets in, perhaps by the intervention of a colder stratum of air, or by drifting over a cooler surface, or which is more probable, by some change in the higher regions of the atmosphere by which the transmutation of heat into electricity is facilitated. Whatever may be the approximate cause, the reaction is violent in proportion as the phenomenon was abnormal by which saturation was attained. Tornadoes, hailstorms, waterspouts, and deluging rains are the natural and inevitable consequences of such abnormal conditions. As might be expected, these hydrometeors mainly appear, and develop their most destructive forms in the vicinity where large areas of land have been denuded of vegetation and exposed to the direct influence of the sun. The pleasant, cool, bracing, and often chilling weather, that follow these violent commotions, show that they were brought about by some sudden cooling process in the atmosphere.

As the main physical law of meteorology concerned in the production of rain must now be sufficiently clear to comprehend and explain the facts produced by its operation in various parts of the world within the

historical period, so we can now proceed to show what has been and ever must be the effect of deforestation. These effects may be treated under three different heads: first, amelioration of climate, where the forest is too dense; second, degradation, where deforestation is carried beyond due limits; and third, permanent aridity and sterility where the destruction is total. First, then, examples of amelioration.

It can not be controverted that the climate of northern and central Europe has been greatly ameliorated within the last two thousand years. Varro speaks of the climate of southern France as unfavorable to the growth of the vine and the olive. Virgil describes the Crimea as subject to the rigors of an eight months' winter. Diodorus Siculus narrates how whole armies crossed the frozen Rhine, Rhone, and Danube. In fact, all ancient authors are agreed as to the rigors of the climate of central Europe at their time.

America affords a similar example of amelioration. The early settlers of New England and Virginia speak of the severity, length, but equability of American winters, which is irreconcilable with their comparative mildness, shortness, but extreme variability now. Jefferson, in his notes on Virginia, records this testimony of the old settlers, which he says is corroborated by his own observation and experience. He says within the recollection of the living generation, the climate has been much modified. The snows are fewer and less in quantity, and remain a shorter time on the ground. Streams that were formerly closed for weeks with ice, now seldom freeze over. The changes from warm to cold and *vice versa* are now more sudden, frequent, and extreme. "When spring then came, it came to stay, and not as now relapse suddenly back into winter."

Jefferson gave it as his opinion that these changes have been caused by clearing away the forests, exposing the soil to the warming influences of the sun, and by giving freer passage to air currents, whether warm or cold. In Europe the amelioration of climate is attributed to the same cause; and there can be no question as to the correctness of the inference.

Who has not observed that the snows and ice of winter lie longer in the forests than in the open fields? Europe two thousand years ago, and America when discovered, were covered with an almost unbroken wilderness of forest. The ice and snow then melted not so soon, and consequently the winters were longer than now. Deforestation whenever carried on within due limits has been a benefit, shortening the winters and producing a general amelioration of climates.

Let us now give a few instances of degradation of climate. The stringent forest regulations of the Tezcucans and Aztecs have already been mentioned. The effects of these regulations and of their abrogation by the conquerors are thus described by Prescott, the historian:

"In the time of the Aztecs, the land was thickly covered with larch, oak, cypress, and other forest trees, the extraordinary dimensions of some of which remaining to the present day, show that the curse of barrenness in later times is chargeable more on man than on nature." And

again: "The soil once carpeted with a beautiful verdure, and thickly sprinkled with stately trees, is now bare, arid, and parched, and in many places white with the incrustations of salt, caused by the diminution of rainfall, and the evaporation of the waters consequent upon the denudation of the country."

Wm. C. Bryant, speaking of the effects of deforestation in Eastern Ohio, says:

"It is a common observation that our summers are become drier and our streams smaller. Take the Cuyahoga as an illustration. Fifty years ago large barges loaded with goods went up and down the river, and one of the vessels engaged in the battle of Lake Erie was built at Old Portage, six miles north of Albion, and floated down to the Lake; now in an ordinary stage of water a canoe or skiff can hardly pass down the stream. Many boats of fifty tons burden were built on the Tuscarawas, and loaded at New Portage, and sailed to New Orleans without breaking bulk; now the river hardly furnishes a supply of water at New Portage for the canal. The same may be said of other streams; they are drying up and from the same cause, the destruction of our forests; our summers are becoming drier and our winters colder."

The former rank and tall grasses on the primitive prairies measurably answered the purposes of forests. The summer rains certainly were then more equable and abundant than now. Streams that forty or fifty years ago furnished milling power the whole year round are now dry, except in time of freshets. The steady decrease of water in our western rivers, even in that of the great Mississippi, warns us of deleterious influences at work and of impending danger. Our steamboatmen recollect the time when steamboats that now can not, in low water, ascend higher than Memphis, could, without difficulty, at all seasons of the year, ascend to St. Louis. Destruction of the forests at the sources of the rivers tributary to the Mississippi, and the wasting the prairies along the affluents of these rivers, are the causes of this deterioration. The unshorn natural meadows, the prairies, are practically amongst the things of the past. The rank, tall grasses, whose wavelike motion showed every pulsation of the wind, are no more. Denuded by our flocks, and the native grasses exterminated, there only remains the naked plain. Now a naked, parched plain is a very different thing from one clothed with the vesture of the primitive prairies. Its reaction upon the atmosphere, and consequently its meteorologic effects, are entirely different. One favors the condensation of vapor and the precipitation of rain, the other favors the dispersion of both. Hence we find with the disappearance of the vesture of the primitive prairies, aridity of climate sets in and the streams dry up. The following fact illustrates this. Near Quincy, Ill., are several streams that forty and fifty years ago supplied ample water for milling purposes. One of these still bears the name of Mill Creek. Were it not for the old dams and dilapidated mills, the tradition that they afforded water power for mills might be regarded as apocryphal; for now all the creeks afford but little running water at any season, and during the whole summer and autumn they are perfectly dry.

In all respects the phenomena of gradual failing of summer rains, aridity of climate, and drying up of fountains, are similar on the prairies as in the forests. On the Atlantic slope, there is scarcely a mill-owner who is not aware that as the country is cleared up, the springs fail, and the streams gradually dry up. New phenomena, however, appear. The rains of summer, though fewer, are more deluging and destructive, and freshets, formerly unknown, become common.

As already stated, all our rivers are suffering from a diminution of water, and indications are thickening, of impending calamities still greater. We are trying to deceive ourselves with the delusion, that our rivers are becoming shallower, because cultivation has facilitated their encroachments on the soil, and that they are only widening their channels. Now this is not the case; and no one can point to a solitary instance that justifies such a hypothesis. In Germany, observations have been made by actual measurements, on the river Elbe, for the last eighty years. The width of the channel has been accurately measured and the volume of water discharged, calculated. In that time the width of the channel has remained the same, but its depth has decreased nine inches, and the volume of water discharged is eighteen per cent. less. The records of the observations and measurements, show that the decrease was gradual and uniform for every decade. What was the cause of this? In the last eighty years, millions of cords of wood and billions of feet of lumber have been cut from the forests and mountains along its sources.

Facts could be quoted indefinitely to prove that islands as well as continents suffer the same deplorable consequences; long drouths, alternating with deluging rains, waterspouts, hail, and tornadoes. Trinidad, Martinique, Cuba, San Domingo, in fact the whole West Indies and Cape Verde Islands, as well as Spain, Italy, Greece, etc., would afford examples to this effect, but we must forbear.

There is, however, another class of facts which can not be omitted without impairing the force of the argument and its application. These facts show that a climate, however much degraded, can be restored.

In the rear of the city of Caraccas, on an elevated plain, the *Theobroma cacao* from which chocolate is made, formerly found its most congenial climate, both as to heat and moisture. But to extend the plantations, the whole plain was denuded of its forests. The result was, the rains ceased, and the climate became so arid that the cultivation had to be abandoned. But nature quickly restored the vesture of the abandoned plain, and the cultivation of the cacao has been resumed. Farther in the interior and higher up on the mountains, is the valley of Aragua. Having no outlet to the sea, its waters collect in a central plain and form Lake Tariqua. In 1555 the Spaniards founded New Valentia, one and a half miles from the lake. In 1800, when Humboldt visited the city, it was three and a half miles from the lake. In 1740, a fortress was built upon an island (Cabiera) in the lake. When Humboldt was there, Cabiera had become a peninsula. He also found new islands appearing in the lake, and many hillocks on the shore called islands, from once

having been surrounded by water. Humboldt attributed this diminution of the waters to the extensive clearings made in the valley. The elevation of the valley and its immense fertility, had adapted its soil and climate to the production of the cereals and fruits of Europe. Consequently it had become almost as densely populated as the valley of the Rhine. When the Revolution broke out, the peaceful valley of Aragua became the theater of many bloody conflicts. At the first cry of independence, both master and slave (the latter being freed) enlisted under the banners of the Republic. Again and again its population was decimated until extermination was accomplished. Plantations being abandoned, the recuperative energies of nature in that tropical clime soon restored the forests. Boussingault, who afterwards visited the valley, in his *Economic Rurale* says:

"Twenty-two years later I explored this valley. For many years previous the inhabitants had discovered that the waters of the lake were no longer retiring, but on the contrary were rising. Grounds not long before occupied as plantations were submerged. The island of Nuevas Aparecidas, which appeared above the surface in 1766, was again covered with water, and Cabiera had again become an island.

Clave, in his "Studies Upon Forest Economies," says: "St. Helena, stripped of its ancient forests has become almost sterile from the failure of rains. Within the last thirty years the wooded surface of the island has been considerably extended by replanting, and the rain has increased in proportion. The quantity now falling is fully double what it was during the imprisonment there of Napoleon."

Wolf Spring, in the commune of Souby, ninety years ago, had no existence. Only after long rains, water temporarily oozed from the soil where the spring afterwards appeared. The spot is in the middle of a steep pasture. About that time the owner perceived young firs springing up on the heights, which under protection soon became a dense grove. When the trees were fully grown a fine spring appeared in the place of the temporary ooze, furnishing an abundant supply of water, even during the longest drouths, for fifty years. Twenty years since, the grove was felled, and to-day the spring is as dry as it was ninety years ago.

Mehemet Ali, the Viceroy of Egypt, fifty years since, planted some forty or fifty millions of trees in Egypt to increase the rains. During the time that the French under Napoleon occupied Egpyt (which was sixteen months), not a drop of rain fell there. Since the trees planted by the Viceroy have become grown, the annual average of rainy days is thirty.

Since the Mormons have settled in Utah, and planted considerable trees, the waters of Salt Lake have risen seven feet. A correspondent in Utah of the Agricultural Department, in June last, writes as follows:

"We must irrigate in most localities, but it has been demonstrated that by planting trees and cultivating the soil the rainfall increases every year, requiring constantly less irrigation. As we have not got the water in all parts of the Territory, we resort to tree planting in the hope that it will remedy the evil."

The English destroyed the forests of the Deccan, once of equable climate and exuberant fertility, until it now has become arid and sterile. For several years the East India Company have been replanting large districts with forests, in hopes of restoring its former climate.

In Queensland, Australia, aridity has so much increased by the indiscriminate destruction of the forests that the Australian government has taken the care of forests in charge, and is annually replanting the denuded districts. If anything further were necessary to prove the deleterious effects of denuding the earth of vegetation, we might quote the highest scientific authorities, who, from facts that have fallen under their observation, have given it as their unqualified opinion that deforestation can not be carried on anywhere without degradation of climate following as an inevitable consequence. These are the well-known opinions, as expressed in their works on physical science, of Humboldt, Herschel, Boussingault, Marsh, and others. But we prefer to let facts speak; they are of higher than human authority.

We must now close the argument on this part of the subject, and proceed to discuss another and perhaps the controlling law of Meteorology, namely; that of electric action. Electricity is of two kinds: the positive and negative; or as it has been most pointedly yet typically expressed in the Zend Avesta, the sacred book of the Parsees: "There are two principles in nature: the male and female. In consequence of being of opposite sexes they are perpetually seeking each other." Positive electricity (the male) fills interstellar space and penetrates somewhat into the upper regions of our atmosphere. Negative electricity (the female) surrounds and fills the Earth and all matter and bodies in space. Now if an insulated conductor be charged with either positive or negative electricity, and brought in the vicinity of another but uncharged conductor, by induction it separates the insensible electricities of the latter, attracting the dissimilar to the nearer side, and repelling the similar electricity to the farther side. Electric attraction, therefore, only subsists between the opposite electricities. If a conductor is corrugated, the ridges will show greater electric tension than the furrows; in fact the latter may be devoid of any sensible electric excitement. The earth is a corrugated conductor; hence the negative electricity with which it is charged mounts to the highest points, and therefore mountains are more highly charged than plains. The positive stoops down to meet the negative, but is prevented by the intervention of the atmosphere, a non-conductor. Their meeting is, therefore, only possible by the happening of either of two contingencies; first, when the mutual attraction is so great as to cause a disruption of the intervening non-conductor, then thunder and lightning take place; or, secondly, when the positive seizes upon some matter floating in the atmosphere, as vapor or clouds, which give it transportation to its mate, the mutual attraction giving the motion. This is the reason why clouds dash themselves with such headlong fury against mountains. It also shows why mountains are the recipients of greater quantities of rain than plains.

In the West, it is a well known fact that rains gather over and follow

belts of timber. Why? Because the trees are higher than the adjacent plains, and electricity everywhere mounts the highest points. Consequently, by the same law that operates in mountains, the areas covered by trees must receive larger quantities of rain than naked plains.

The law of electric distribution is, that it is evenly distributed over equal areas of surface. Now everything on the surface of the earth, as a house, tree, stem, branch, or leaf, adds its superficies to the superficial area of the earth, and receives its equal part in an electric distribution. Hence an area of timbered land by its trees and their foliage may have its area of surface increased five thousand fold over an equal area of plain. Consequently its electric potentiality will be increased in the same proportion. Hence, its electric reaction upon the atmosphere will be in the same ratio, and will attract to itself more copious and abundant rains.

The great lesson inculcated by these facts for man's benefit, is that he is endowed with power to become an ameliorating agent on the earth; that he, within limits, can control the elements, and make them ministers of his welfare and happiness by modifying climate where too rigorous, and employ them to repair the waste places of the earth. To do this, he has only to plant trees where they have been destroyed or are absent. He will then realize the truth of Mahomet's benediction, "Blessed is the man that planteth a tree:" and the philosophy of the remarkable aphorism of Zoroaster in the Zend Avesta, "He that planteth a tree watereth the earth, which is a more acceptable service to God than prayer and praise, or burnt offering and sacrifice."

The planting of trees will not only temper the heats of summer and the rigors of the cold of winter, but it will effect a condensation of vapor and facilitate the precipitation of rain. Moreover it will effect an accumulation of electricity, and wherever there is an accumulation of electricity, there is a favorable condition for a wedding between the son of Cœlus and the daughter of Terra. The bride, to meet her spouse in the air, mounts the highest trees or ascends the highest mountains; but he can only meet her by water. Hence he makes the clouds his chariot and brings to the nuptials a shower, a gift so grateful to Ceres and Pomona. The earth rejoices at the marriage, and teems with bountiful harvests and luscious fruits.

The great lesson is now before us. Will we repair the injuries the thoughtlessness and recklessness of man has inflicted upon the earth and its climate? will we go forth and ameliorate the rigors of climate on our great Western plains? yea, more, will we make the great Sahara again blossom like a rose, and a congenial habitation for man? Or, will we make of ourselves, as man has made of himself throughout the past, a fugitive and a vagabond on the face of the earth, ever fleeing from, but never entirely escaping the curse wherewith our stupidity has smitten the earth? With us and ours is the responsibility, whether all the waste places of the earth shall be reclaimed, or, whether greater calamities now impending shall come upon us, fulfilling the vaticinations in the soliloquy of Bryant's Indian revisiting, in the East, the burial places of his fathers:

"But I beheld a fearful sign
To which the white men's eyes are blind;
Their race may vanish hence, like mine,
And leave no trace behind,
Save ruins o'er the region spread
And the white stones above their dead.

Before these fields were shorn and tilled,
Full to the brim our rivers flowed;
The melody of waters filled
The fresh and boundless wood;
And torrents dashed, and rivulets played,
And fountains spouted in the shade.

Those grateful sounds are heard no more;
The springs are silent in the sun;
The rivers by the blackened shore
With lessening currents run;
The realms our tribes are crushed to get,
May be a barren desert yet.

Discussions upon the topics of Mr. Tice's paper were postponed until the afternoon session.

On motion, the Society then took a recess for dinner.

THURSDAY AFTERNOON.

The Society re-assembled at the usual hour, and devoted a half hour to discussions upon topics of Mr. Tice's lecture.

Prof. Turner—Mr. President, I wish to express my hearty concurrence in the general scope and end of the highly interesting paper read by Mr. Tice. But I wish to suggest also that there are other causes that have operated to change the climates and the productiveness of the continents, besides the changes in their forests.

I believe, notwitstanding the counter opinions of the books, and the theories, that it can be mathematically demonstrated that the earth has now, and ever must have had a slow and imperceptible oscillation, if not an entire revolution from north to south. This is as demonstrable as its revolution from west to east. Let any one reflect on the immense amount of debris, the thousands of millions of tons of rocks, stones, and sand that the great northern icebergs perpetually tear away from the shores of our northern seas and bear towards the equator, building up whole continents of newly made shoals or banks, like those of Newfoundland; and also on the immense amounts of slime and mud carried by the rivers of the two continents, in the same direction, and he will see that it is impossible that the earth's centre of gravity should not be changed; and with it the relations of the Equator and the Poles to its whole mass.

This necessary motion will at last be found to be the true cause of all the varied and complex phenomena which have so long puzzled our geologists; inducing them to fill good Mother Earth now with fire, now

with water, and now with wind, as if designing to throw her into a fit of cholic and extort the secrets of nature from her by torture. But she don't confess. Let any one think this very simple matter through, and he will find one single, simple cause, which, like the great cause of gravity, is in itself alone adequate to account for the fact that marks of polar icebergs are found under the Equator; while tropical products are everywhere found strewed about the poles: simply because the poles must have been where the Equator now is, and *vice versa*, perhaps many times, and will be again. And as the equatorial diameter of the earth is about twenty-six miles longer than the polar diameter, this simple cause alone would, in these changes, whelm all parts of the polar earth under water, some thirteen miles deep, did the solid earth retain its shape in the process; just as we now see all the European side of the globe becoming warmer, and sinking, as it is said, relatively to the waters; that it is *dipping under them*, in the progress of its advance toward the Equator; while other parts are rising or moving in an opposite direction.

But the solid parts of the globe, under this prodigious, perpetual strain, can not hold their place. The strain generates heat; heat generates and inflames gases, and breeds earthquakes, volcanoes, and all that perpetual train of phenomena by which the old crust of the globe is broken up and new mountains and islands raised, as well as old ones submerged, till the whole surface becomes re-adjusted to its perpetually changing new conditions. True, an entire polar revolution may not be attained in millions of years, but it is bound to come in time, if like causes continue to produce like effects.

And in these apparent catastrophes (but in fact as regular a progress of simple law as the return of night and day), new mountain ridges will be thrown up, new wastes and sand deserts formed, new changes and conditions of climate made, as much more potent than any simple denudation of the earth of trees, as these mighty, perpetual, and irresistible forces are greater than the simple power of the woodman's axe.

I think, therefore, that when we ascribe all these mighty changes in the past, in the great deserts of the continents, to simple changes in the forests, our cause is too narrow, although I agree fully with all that has been said, or can be said of the immense importance of our planting trees to ameliorate our climate, as a practical measure, so far as our feeble endeavors can be made to go; still these higher, mighty causes will go on, and over which human beings have no control. The earth will continue to complete its destinies of revolution and change, of growth and progress, as sure and certain as the growth of an animal or vegetable, though by a law more terribly vast and resistless to earth and all its varied destinies and races.

Mr. Douglass and Dr. Spalding followed with interesting remarks, which, however, the Secretary was unable to take down.

Dr. HULL, State Horticulturist, then read the following paper on Peaches, illustrating the same on the blackboard, and making explanatory remarks:

REPORT.

It may with truth be said, that the cultivation and study of plants is more ancient and as honorable as any other human pursuit. With equal truth it may also be said, that much of the ardor in Horticulture is clearly traceable to the fact that men constantly desire a change; are always seeking for something which is new; and in no department of industry are they so often gratified as when they familiarize themselves with the growth and development of plants; for in the most of those which we cultivate, a change is constantly going on, from the time the little plants are out of the ground until they are of bearing size. Again, some of these, when they come to perfect seeds, because of the change wrought in them by culture, produce as many varieties as seeds. It is this yielding condition which makes plants the most interesting of all cultivated things.

In no department of fruit culture are variations more likely to occur than in the peach; for were we to plant all the seeds perfected by certain varieties, the probability would be that not a single seedling would be like the parent, nor would any two be alike. It is true that some good varieties having reniform glands generally come the same, or in the majority of cases nearly the same. But with most varieties the fruit would differ so widely, or be of so inferior a quality, that out of thousands the chance would be that not one could be selected which could compete in quality and size with any one of the ten or twelve which have been selected as best for orchard culture.

With many new beginners one of the most common mistakes consists in seeking after and planting comparatively new and untried varieties, the high prices charged inducing the thought that lauded sorts must possess some excellence which will give to the fortunate posessor superior advantages over those who confine themselves to a few well-selected varieties. The real truth is, the smallest and most select number of well-tried sorts, which will give a regular succession, and about a given supply each day through the season, will be more easily handled, and prove much more profitable, than selections of either all early or late varieties.

But a few years ago peach trees in nearly all the southern part of the State had only to be grown, and they would produce abundantly, and almost without care. But as orchards came to be greatly multiplied, the supply of food by which noxious insects are sustained caused them to be vastly increased; so much so, that now most of the fruit while immature, is spoiled, or, that which escapes destruction is so scarred and damaged that it is of but little value, either for family use or for market. So rapidly, in fact, have some of the fruit insects spread over the land, that at the present time there are but few orchards, in what are termed the fruit districts, which pay more than the taxes, without yielding any thing from which the farm can be kept up, or a family supported. It is admitted there are exceptions to this rule, but the orchards forming the exceptions are those which are kept free from insects by artificial

means, or such as are isolated and bear occasional crops, or have but recently come into bearing.

Again, it sometimes occurs that all the fruit over a considerable extent of country is killed in the bud by extreme cold; by this means, the following summer the insects are starved out for want of food. The like of this has probably occurred this year in much the larger part of Southern Illinois.

In addition to variation in varieties and insects to infest the fruit, there are many other causes operating to make peach-growing as diversified an occupation as one well could wish, as will appear as we proceed.

It is common to divide peaches into three classes: 1st, Glandless; 2d, Globose; 3d, Reniform.

We have on several occasions stated that the glandless varieties were subject to diseases of the leaves and young branches, generally to such an extent that this class ought wholly to be discarded.

The disease affecting this class is mildew, and in most years it spreads from this to the other classes. In orchards where there is much stung fruit, the mildew, which is common on trees of the first-mentioned class, appears to spread and find a lodgment in the punctures made by insects, and from these to the leaves, branches, and finally to the sound fruit, producing, as we think, that kind of disease now so commonly known as peach-rot. It also produces the rot in plums, cherries, and other fruits. In the past few years this rotting of the fruit has blighted the hopes of thousands, and for aught we can now see, it will continue to do so for many years to come, or until orchardists shall do more to check its spread. This rot in the peach, or rather the fungus which causes it, is believed to exist in all our orchards, and will probably continue as long as glandless peach trees are grown, or curculios are permitted to make wounds in the fruit to which it can attach.

By this we would not be understood that there would be no rot, provided all varieties which are destitute of leaf glands were removed, because we are not sufficiently familiar with fungi producing rot, to say whether it must first be propagated on leaves or branches and afterwards spread to the fruit. Our own observation, and facts respecting it which we have gathered from others, lead to the conviction that whenever the conditions for its growth are favorable, it will appear at first attaching most to wounded or weakened structures, and later, when it comes to be greatly multiplied, then to the healthy fruit, also to leaves and branches, rotting the former and killing the two latter.

So little was there of peach rot at Alton, prior to 1865, that no one practically knew any thing about it. In the latter part of July of the year, however, it appeared in several localities. It was first observed in an orchard only one fourth of a mile from our own. The infected orchard is divided by the highway, all the early glandless varieties are one side, and it was on the fruit of these trees we first discovered the rot as a disease, that is, sweeping off all the fruit and destroying leaves and branches, as before stated. The first intimation we had of the presence of this rot, was from the stench which we encountered in passing along the road.

We had often heard of this disease in Southern Illinois, but until this time, had formed no just conception of its destructive effects.

It will be proper, here to remark, that the orchard in question had been wholly neglected; the greater part of the peaches had been stung, and the weeds were reaching well up into the heads of the trees. It is needless to add more with respect to this orchard, than to say, since the rot appeared, it has not paid interest on the cost of planting the trees. About eight days after our attention was directed to this orchard, the rot appeared in our own, and so rapid was its dissemination, that fully as large a force was needed to pick and remove rotting fruit, as would have been necessary for marketing the crop. The next year seven eighths of our cherry crop rotted; and each year since, our own fruit and that of others near, has not escaped.

In our own grounds we have experimented a good deal on such varieties as Tillotson, Serrate Early York, Hale's Early, and are well satisfied that the rotting of the latter variety would never occur away from glandless varieties, so long as the skin of the fruit is free from wounds. But such as are stung by curculios or wounded by them at any time, or even such as are punctured by a pin, after the stoning process is completed, will rot. When a tree has many damaged fruits on it, the spores producing the rot seem to fall upon that which is sound, rotting it also.

One of the ex-Presidents of the Illinois Horticultural Society, the Hon. A. M. Brown of Villa Ridge, says that he has carefully experimented by catching curculios, and picking every stung fruit off his Hale's Early trees, and in every instance with satisfactory results. In short, he does not consider either the curculio, or rot, any great hinderance to peach growing; as he can easily catch the former, and thereby prevent the latter.

Two years ago, last year, and again this, in our own grounds we have clearly demonstrated the correctness of his views, as a brief statement of this year's operations will show. We have about twenty bearing trees of the Hale's Early. These trees were set in different parts of an old orchard, to fill vacancies, which from time to time had occurred. Three of these trees stand at an exposed corner of the orchard, that is, where fruit-insects come in from surrounding orchards.

Two of them were run once in two days until the stones were hardened, when no further attention was paid to them. After this, every peach on these two trees was punctured, either for the deposit of eggs or for food, and all rotted. The third tree was run every morning; and each day, after the run of the orchard was completed, a curculio catcher was left near for the convenience of jarring the tree in the evening or at any other time any one should happen to pass that way. About one-third of the fruit on this tree was stung, but this was all picked off and not a peach rotted.

Of the remainder of the trees, scattered over the orchard, four of them, like the one we have just mentioned, were protected. From these a supply of fine peaches for the family and a few boxes besides were secured,

while the fruit on all the other trees, together with most other early varieties, was spoiled.

From the information derived from these experiments, it appears that the main difficulty to be overcome in growing the peach is to stop the breeding of curculios, when the much dreaded rot will not be more common than in former years.

It is not our object here to show how this can best be done, but will state that in properly grown, isolated orchards, the cost of complete protection need not exceed four cents per tree. Whatever will protect an isolated orchard will also apply to a whole fruit district, embracing hundreds of thousands of trees, when the whole are treated as though they were but one orchard. When this is done there will be no migrations from one orchard to another, for in all, the little Turk would come to grief at the same time. Destroy, then, this worst of all orchard pests and our trees will once more, by the returns they will make, convince the most skeptical that there is no such thing as natural deterioration of either trees or fruits, but rather our misfortunes come from the common neglect.

By this we would not wish to be understood that there are no diseases affecting the vitality of the peach, for, not only in this, but in some of the adjoining states, an incurable disease, known as the YELLOWS, prevails.

In several places visited by us, the contagious nature of the disease, or rather the disease itself, was not recognized. In these districts great numbers of trees are now so contaminated that it is doubtful if healthy orchards can be grown near, until all the trees now standing are first swept off, and time allowed for the disease to die out. This is a matter in which all the counties in the State, where the peach is grown, are deeply interested, for it is quite evident that a single tree affected with the yellows, may, through the agency of bees or the wind, disseminate the disease to trees over a wide extent of country, or to all such as the bees happen to visit, with the pollen of the yellowed trees adhering to them.

At the present time there is great danger that some of our nurserymen may obtain their seeds for propagation from districts where the yellows exists. Indeed, in the past summer in several nurseries we have found unhealthy seedlings, which were but a few inches high. Healthy peach seeds can, with certainty, no longer be procured from the canning establishments or hotels, either at St. Louis or Chicago; as very large quantities of peaches grown on infected trees are consumed in those markets, and more than this are, through the agency of commission houses, sent to all parts of the West.

It is then to be hoped that hereafter all who propagate peach trees for sale, will be cautious with respect to the source from which they obtain their seeds.

We think very little is known of the causes producing the yellows, neither can we add any facts of interest not already stated, unless it be with respect to the color of the leaves. Such as are from diseased parts

of trees, after being a day or two kept in corked bottles, show a yellowish dust. This, when highly magnified, is found to be a minute cellular growth, not unlike that found on blackberries, described by us during the year, with this marked difference, however, that the little cells on the peach leaves are not more than one-twentieth part as large as those of the blackberry, and what appear to be the older cells have a decided tinge of red.

So amusing an incident has come to our knowledge, with repsect to this disease, that the mention of it here may not be without interest. A gentleman who had planted a number of Hale's Early trees was much pleased to find one among them three to four weeks earlier than the rest. His conclusion was that this tree was a chance seedling and that he was really in possession of the earliest peach known. His first intention was to bud largely from it and control the variety until he could get a bearing orchard of it; but his enterprising neighbors finding him the fortunate possessor of so remarkable a variety, he was, as he thought, obliged to sell buds at fifty cents each, or have them stolen. His plan was to sell the buds; accordingly, more or less trees in that neighborhood were budded from this supposed early tree. It is unnecessary for us to state the estimation in which this variety was held after the fact was made clear that it was Hale's Early affected with the yellows. It is only necessary to add that nearly every orchard in that neighborhood is badly, if not incurably, diseased.

If to the difficulties already explained, we add the peach tree borer in the collar and larger roots of the trees, we have mentioned all the insects and diseases which very materially interfere with growing the peach. The mode of destroying the borer we will pass over, as we have during the year, given the best means for ridding trees of them.

We will next treat of some other points which may be of more interest. In the southern half of Illinois, peach trees come into bearing some at three, others at four and five years of age. As trees are ordinarily treated, the first crop is best. Each succeeding one the fruit is of diminished size. So true is this that no saying is more common than, "that peach growers are lions in the market, while they are marketing their first crops, but are not afterwards heard of." There is too much truth in this remark, and it is exceedingly mortifying to most persons after having once gained a reputation for growing fine fruit, to see their trees in succeeding years producing only small and inferior specimens. Notwithstanding, but few persons endeavor to solve this. This falling off in size with age, is wholly due to a condition the trees get into, which if corrected, the old trees would, in many respects be better than younger ones, because old trees can be made to produce the best fruit. But before we can hope for much success in preventing this gradual falling off in the size of the fruit, we must have a correct idea of the causes; otherwise, all of our efforts would be of that haphazard character which would quite as likely increase as remedy the difficulty we desire to avoid.

There are several reasons why young peach trees are more active and

produce better fruit than old ones. On the former there is no more large branch growth than is required to support the smaller ones and the foliage; but as trees become older, the numerous branches forming in the interior of the trees are gradually shaded out. In this way, each year the young growth is made farther out; this in turn yields to such as afterward forms still farther out. In this way long limbs are formed, having only small branches and leaves at, or near their ends. Nor is this all, for in addition to these naked branches we find a corresponding growth below ground. Here large roots, which at first were clothed with fibrous roots, in time are quite destitute of them, often for many feet. Each branch root, as it forms, is first clothed, but afterwards, when they become large, all their fibrous or more active roots are at the ends. Let us for a moment inquire the effect these naked branches and roots are likely to exert on the trees and on the fruit. To comprehend this, we must first consider that each summer, layers, not only of wood, but of bark as well, must be made throughout the entire length of these long roots and naked branches, to connect the root feeders with the leaves.

To ascertain whether roots of old peach trees are in the condition we have stated, one has but to inspect those of any old orchard. Then he will more clearly comprehend how enormously the small roots and leaves are taxed to make the annual layer of wood and bark growth, of which mention has been made. By inspecting the tops of trees, one sees less than half the naked surface yearly to be covered with new growth; for in nine cases out of ten a much larger disproportion exists between active and naked roots, than between the leaves and branches.

This condition of all others, is most to be avoided; for both the new wood-growth and the fruit draw for the same material.

For this reason, when the trees make a crop of fruit, the new wood-growth will be so thin, and have so little plant food stored, that such trees can not the following year produce much fruit, or if they do, it will necessarily be small. We have within the past two years inspected the roots of many trees, on which there was not a fibrous root nearer than six feet from the trunks. By this we do not mean that in that distance there were no branch roots, for in most cases there were many, but each in turn had become naked, with only tufts, as it were, of rootlets at their ends.

Every time a tree perfects and carries safely through the winter a large number of fruit germs, it is then taxed to carry them through their period of bloom. In addition to this, the young fruit must be sustained until near the time when the seeds begin to harden. This must be done almost wholly out of materials which were stored in the tree the previous summer. While this draft is being made, the tree has at the same time to draw from the same material for the enlargement of germ branches and leaves, also for the production of new rootlets and root hairs. Therefore, it can be comprehended, when all these parts have to be sustained from a common store, affording, perhaps, but a scanty supply, that the less active roots, as well as branches, will cease to act, and die; those only sustaining themselves which are youngest and best situated with

respect to soil. It is for these and other similar causes that roots annually become more and more naked, until they, in connection with the branches, require so much to sustain them that the fruit they produce, with the exception of a few at the ends of the branches, becomes so small that, to sell it at all, some growers keep up a succession of young trees from which to get good sized specimens to cover the exposed parts of their packages.

There are so many other reasons why large roots, of which we have spoken, become rootless, and branches branchless, that we shall not attempt to enumerate them, but will state some of the more prominent, which operate most injuriously on young root growth, viz: larvæ of various insects feeding on the more tender and succulent parts, want of cultivation in time of drouth, over fruiting, crowding the young top-growth, so as to shade out numerous branches and leaves. But a more fruitful cause than all these is the severe top-pruning the trees often receive in the summer.

From the several requirements of the peach, and we have named only a part, it will be seen that its cultivation, to insure success, requires a practice quite as varied as that of almost any other tree or plant. At least sufficiently so to employ an active mind years to understand and master all.

E. S. Hull.

Jonathan Periam, who had prepared a paper on Gardening, being unable to attend the meeting, had forwarded his paper to the Secretary to be read.

ECONOMIC GARDENING.

BY JONATHAN PERIAM.

To attempt to cast any new light upon the subject of Gardening, I am aware, would require the effort of one, who for years past had given more practical attention to this branch of Horticulture than my other duties have enabled me to do.*

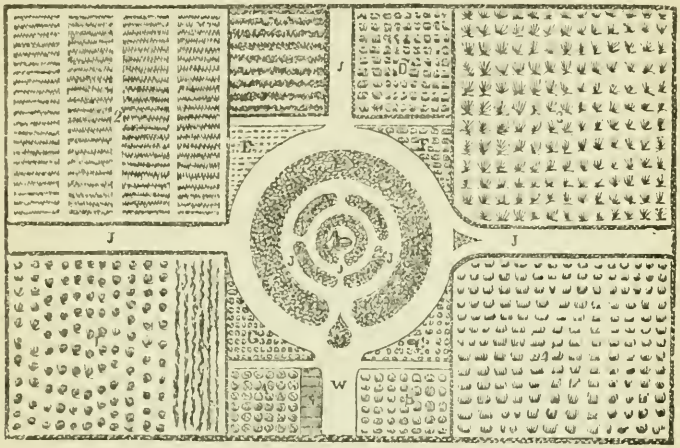
I shall, therefore, attempt, Mr. President, only some brief remarks relating to laying out a garden in a compact and economical form, introducing therein a plan for combining some floral effect, to supply a want that is sometimes felt among farmers who feel that their means will not allow them to gratify their taste for flowers in any other way. At the same time I am well aware, and all must admit, that the vegetable garden is not the place for true floral effect.

The importance of gardening, we all admit; its necessity, as a means of greater enjoyment of the bounties with which Providence has blessed us, all know. We also believe that the greater change of diet that it will give will be conducive to increased health and longer life, enabling

*Note.—Mr. P. has, doubtless, had as successful an experience in this business, in former years, as any person in the State.—*Editor.*

us to dispense mainly with the services of the doctor. And yet, notwithstanding all this appreciation, how few of the better class of our farmers have even a passably good garden. How many of ordinary farmers have none at all.

I shall endeavor, in a rough way, to show how to lay out a garden, such as any practical farmer may have, leaving much, perhaps very much, to the imagination of the reader. Any plan will, of course, be modified or changed to accommodate the quantity or shape of the garden plat, or to suit the taste of the owner.



GARDEN PLAT.

(Cut taken from Prairie Farmer Annual.)

A—Raspberries.
B—Blackberries,
C—Currants.
D—Gooseberries.
E—Asparagus.
F—Rhubarb.
G—Strawberries.
H—Roadway, ten feet wide.
J—Paths, five feet wide.
K—Flower beds, five feet wide.
L—Border for flowering plants, nine feet wide.
M—Pear-shaped bed, for ornamental plants.
N—Hot-bed; sash with four rows of glass, forty inches wide.
P—Beds and curves, showing how ornamental effect can be produced.
1, 2, 3, 4—Vegetables.

The two principal paths, J, are shown of the same width as the roadway. They may be reduced to five or six feet if necessary, or may be left out, and temporary paths made from year to year to facilitate planting. The circular roadway enables you to manure each separate plat. The path to the right is shown with rounded corners, which will enable you to introduce ornamental beds. The pear-shaped bed should not be so large as to interfere with the passage of a cart or wagon.

We will imagine the farm-house and offices located, as they generally are, upon an eminence that is better than ordinarily drained, naturally; for one of the pre-requisites to successful gardening is *drainage*, although

the same practice will apply also to successful farming, for it is an excess of water in the soil that more often destroys the hopes of the farmer than drought. Drought *scares* the farmer, but water destroys his hopes. This remarkably dry season has done more to satisfy me of the truth of this proposition than all other years of my life put together; and if you will allow me to diverge for a moment, I will state why.

The spring opened, in Livingston County, after a dry fall and winter, with but little rain, enabling the farmer to get in his crops in good condition. From the eighth of April until September we had but three light showers, neither of them moistening the soil to a greater depth than three inches; but, nevertheless, upon our deep fall plowing, we had a good crop of corn and a good crop of beets. The land retained its friability in a most unusual manner, and, if my observation is not at fault, is owing to the fact that the soil being, from its dryness in the spring, open and porous, has remained so during the season from the absence of beating rains falling faster than the soil can filter them. It is water running over or standing upon the surface that renders the soil compact and impermeable to atmospheric influences. If thoroughly drained, either naturally or artificially, this could not take place. But to return to my subject.

Imagine the site for the garden selected as near the house as possible. We will take a parallelogram ten rods wide by sixteen rods long. This will make just an acre. We will divide it into three equal portions, each five and a third rods by ten rods. A roadway should enter from one side, at the center of the middle plat (or half the length of the garden), parting at two and a quarter rods from point of entrance, and surrounding a circular plat in the center, letting the outer edge of the roadways just touch the inner line of either of the other plats. The point of emergence will then be exactly opposite the entrance, and the circle enclosed by the roadway will be sixty-seven feet in diameter (the roadway being ten feet wide). This circular central plat is to be dedicated to the ladies of the household for a floral department, and may be laid out in a variety of forms to accord with their tastes.

The four corners, cut off by the roadway and between it and each of the other oblong plats, are to be used for hot-beds, asparagus, rhubarb, currants, and gooseberries. Now we have two-thirds of the acre for the vegetable garden, divided into plats of one-third of an acre each. As they are in two "lands," each five and a third by ten rods, they are easily plowed. The plowing may be done by commencing in the middle and backfurrowing, leaving the single last furrow outside, not next the fence or barrier, for I would leave a strip and plant a row of blackberries, raspberries, or dwarf fruit trees there, and the furrow into which all the lumps and trash might be raked would be next them.

But some might object to plowing in a garden, and with considerable reason too. In these cases let them divide the oblong plats into squares by walks, and they will have four squares, containing nearly one-sixth of an acre each; and the borders of the walks may be planted with currants and gooseberries, and the portions previously set apart for them

(next the roadway), may be planted with blackberries and raspberries. The borders next the fence may still be used for tender dwarf fruits, etc. But, says the farmer, "what shall I do with the flower garden? I know little or nothing about flowers." Well you are not expected to do anything with them but admire them. These, and their culture, may, as I said before, be safely left to the ladies. The flower garden is their natural province. You are not expected to do much about the vegetable garden either, except to furnish the best man you have, always under the supervision of the ladies of the household, and enjoy the fruits thereof at breakfast, dinner, and tea. The labor of one man will do it, and it will be the best investment of a one-man-power that you have ever made. It will bring plenty to your household, drive away fever and ague, and megrims, and the various other diseases incident to a diet of "hog and hominy," to say nothing of affording a very pleasant place in which to stroll of a summer evening, after tea, and admire what a little pleasant labor will accomplish. But perhaps you will say, "what has this to do with economic gardening?" A *part* of the economy is in having a compact little place combining the ornamental with the useful, but much more in the renewed health and vigor that a diet composed largely of succulent vegetables will give you.

But the next thing is how to grow them economically, and this can be accomplished in a well-drained soil, deeply tilled, heavily manured, and watered when dry. The drainage we suppose to be good. If not, make it so by thorough draining with tile, laid at least three feet deep. This may cost you sixty or seventy dollars, but it will be money well expended. It is one of the pre-requisites in gardening. The deep tillage may be accomplished by the aid of three horses, or which is better, three mules, abreast. Each and every plat of this garden may be manured from the main and circular roadway, and the watering may be accomplished by means of a force pump in the center, and a hose.

The Hot-bed—that *sine qua non* of every well-arranged garden—is placed near the entrance at the south of the road way. This will enable you to handle the sash and covers easily, and it will, besides, be near enough to the water to be easily accessible. In cropping a garden, the deeper the tilth, the more manure may be applied; and this should always be thoroughly decomposed if possible. If this is the case, one hundred loads may be safely applied, to start with, and thereafter, from thirty to forty loads annually. But some of you may say, "It is no easy matter to plow under one hundred loads of manure." It is easy enough, however. Spread, evenly, forty loads over the surface and harrow thoroughly, then with your deep tiller plow this in—a foot deep if you can. Spread forty loads more and plow six or eight inches deep. Then spread twenty loads of the finest manure on top, and in the spring before working the land, harrow it until the tilth is perfect. The other work should have been done in the fall. Upon a soil prepared in this manner you will not suffer from too much, or from a lack of moisture, and your principal waterings will have to be expended upon your rhubarb, aspara-

gus, strawberries, lettuce, radish, celery, and other moisture-loving plants. One reason why a garden should be heavily manured and have plenty of water is, that the excellence of most vegetables consists in their succulence, and this can only be produced by forcing their growth. This, plenty of food, water, and good care (cultivation) will always accomplish.

No idle spots must be allowed in the garden. They will become harbors for weeds. No useless fallows—the spaces between the rows are the fallows—no yearly rotation. The land must labor with a rotation each year—thus, early radish, lettuce, turnips, beets, top-onions, carrots, spinach, and other quick-growing vegetables may be succeeded by sorts transplanted from the hot-bed, and also by the late corn, beans, and melons. The only rotation being to succeed fibrous rooted plants, when practicable, with top-rooted ones; and plants maturing their fruit above ground, with those bearing their fruit below; and plants loving a partial shade should be planted in such portions of the garden as will most easily ensure this. Pains should be taken also, to plant the taller growing vegetables so as to obstruct the view from the walks as little as possible, which may be accomplished, measurably at least, by the exercise of a little skill and forethought.

Many very practical amateur gardeners object to the use of the plow in the garden at all, and with very good reasons, especially in a small place, but in the plan here described, the use of the plow in preparing the land need not be dispensed with, since the cross-roadways need only be temporary paths, which may be made yearly, while the central portion of the garden is entirely filled up with perennial plants. The principal objection to plowing, heretofore, has been that the spade would more thoroughly pulverize the soil than the plow. But with our present improved forms of plows, the pulverization is fully as complete as the ordinary spadesman will effect, and much better than an unpracticed one would accomplish. Within all the angular and circular surfaces, however, and wherever perennials are planted, nothing but the spade and other hand-implements may be allowed.

Where scenery is an object, but little care need be required with the roadways, except the wagon way. This ought, if possible, to present a hard surface; but if this is not practicable, the surface should be kept rounded, smooth and clean, as should indeed all the paths. This may be accomplished, principally with a good rake, by raking to the middle of the road-way from both sides. The great objection among farmers, to the kitchen garden is the cost. They dislike to spend fifty to one hundred dollars a year upon an acre of land. But if they would reflect for a moment that this outlay will produce from two to five hundred dollars in produce, the surplus of which, or that not needed for consumption in their own families may be easily sold at good prices in the nearest village or city, if not indeed, to their more negligent neighbors, the objection must cease; for there is no doubt that the produce of an acre of garden, well attended, will supply all the vegetables a large family will need, besides selling enough therefrom to defray all the expenses of its cultivation.

Dr. WILLIAM LE BARON, STATE ENTOMOLOGIST, read a most excellent paper upon *The Sudden Appearance and Disappearance of Noxious Insects*, which was listened to with great interest. As however, the greater part of the matter contained in this paper is to be found in his report as STATE ENTOMOLOGIST, the reader is referred to this report, in the Appendix of this volume.

After the reading of Dr. Le Baron's paper, the Society, by vote, had a recess until the hour of the evening session.

THURSDAY EVENING.

Meeting called to order at the usual hour by the President.

A. M. BROWN, from the committee on the President's Address, called for the reading of the resolution in their report relating to legislative action to encourage tree planting, which was read by the Secretary and adopted by the Society.

The President appointed Messrs. Samuel Edwards, M. L. Dunlap, and O. B. Galusha as the committee called for by the resolution.

Mr. STARR moved that Robert Manning, of Salem, Mass., be elected an honorary member of this Society.

Approved.

Mr. STARR, from the Committee on Wines, presented the following report:

REPORT OF COMMITTEE ON WINES.

Your Committee on Wines, having examined those presented to the Society, would respectfully submit the following report:

From J. L. Moore, of Tower Place,			
a White Concord, of vintage of	1868,	graded	80
Delaware, of vintage of	1868,	"	80
From A. H. & G. B. Worthen, Golden Bluff Vineyards, Warsaw,			
Clinton of	1868,	graded	70
Clinton of	1869,	"	75
Norton of	1869,	"	65
Catawba of	1868,	"	65
Concord of	1869,	"	60
Hartford of	1869,	"	55
From J. E. Starr, Eminence, Jersey County,			
Concord of	1869,	graded	76
Taylor of	1869,	"	80
From A. & T. Starr, Godfrey,			
Concord of	1869,	graded	80
From James Keeler,			
Ives of	1870,	graded	50

From Joseph Starkey,
Concord of.....1870, graded 73
From D. B. Wier, Lacon,
Concord of.....1870, graded 77
A. A. Hilliard, Brighton,
Concord, impure, cask-flavored.
Cider, six years old, nut-flavored, sweet and palatable.

Your Committee would be understood that in grading wines, one variety is not compared with another, but each stands upon its merits. We regret that there was not a better collection to represent this important branch of Horticulture.

Respectfully submitted,

J. E. Starr, *Chairman.*

The following paper was then read by the author.

THE EFFECT OF SETTLEMENT AND CULTIVATION ON FRUIT CULTURE.

BY ROBERT MANNING, SALEM, MASS.

The subject assigned to me, "The Effect of Settlement and Cultivation on Fruit Culture," is a wide one, and, unlike most others, does not become narrower but wider by division. The "Effect of Cultivation on Fruit" might be taken to include all the changes which have been produced in fruit by the hand of man since Adam was placed in the garden of Eden to dress it and keep it. But taken in connection with the "Effect of Settlement," and with the subject on which I had the honor to send you a paper a year ago, "The Deterioration of the Apple Crop," I infer that the less favorable or positively injurious effects produced by settlement and cultivation form the aspect of the subject which I am more particularly expected to discuss.

There are plants which appear to have an instinctive love of human habitations, and to linger around their ruins. The butter-cup and the plantain spring up around the footsteps of man wherever he goes; others seem as untamable as the Indian, and disappear before the advance of civilization, among which, as a fruit-bearing plant, may be particularly noted the wild strawberry; so also birds and insects disappear, as the country becomes settled, to be succeeded by others. The midges, which are so annoying in wooded wildernesses, are almost unknown in thickly-settled localities. On the other hand, the increase of destructive insects is but too well known to fruit-growers.

Let us consider the effect of settlement on climate. The most noticeable effect of settlement in wooded countries is the removal of the forests. It is a well-established fact that trees and other plants possess a specific temperature, though in a much less degree than animals; but whether this is sufficient to perceptibly raise the temperature of the air in winter can not yet be stated, though it seems not impossible that large extents of forest might produce this effect. But there is no doubt that the shelter

from cold winds afforded by extensive tracts of forest does have an influence on the temperature most beneficial to fruit trees, and even to hardy young forest trees, and that the loss of this shelter, by the destruction of the forests, causes corresponding injury. The failure of the peach crop in New England is attributed, by good authorities, to the deprivation of the shelter formerly afforded by the forests.

Continued cold weather, within certain limits, is less injurious to fruit trees than frequent and sudden changes from warm to cold, and *vice versa*. In the shade of forests the snow which falls remains on the ground, while, if the same land were cleared of wood, the snow might fall and melt several times during the winter. It is easy to see that when forests are of large extent the climate would, in the former case, be much less changeable than in the latter.

The specific heat of trees is not only greater in winter than that of inorganic bodies, but less in summer, as is proved by the warmth of a fruit just taken from the tree when compared with that of one which has lain for any length of time on the ground, even when both are equally exposed to the sun's rays. Every one must have noticed, when a dense fog fills the air in summer, that water drops from trees long before fences and buildings are wet; hence the moisture of the air is, in wooded countries, condensed in the form of rain or dew much more frequently and regularly than in treeless countries, which depend for precipitation of the moisture of the air on causes far less constant than the continual presence of trees.

The electric condition of the air, as affected by the thousands of miles of conducting substances, which, in the form of railroad tracks or telegraph wires, have been stretched over the country, deserves investigation. It is noticed that summer thunder showers do not, as within my own remembrance, when over, leave the air bright, clear, and refreshing, but sultry and close. It is thought highly probable by some who have given much attention to meteorology, that this change, simultaneous with the introduction of railroads and telegraphs, is closely connected with it. I know not whether this change affects vegetation for good or ill, but it appears to me likely to favor the growth of fungi, and consequently to injure other plants; but, as I have said, we need further observation on this point.

Artificial drainage of land, though highly beneficial to fruit trees, indeed absolutely necessary when nature has not provided it, is yet too limited to produce any general effect on the climate. But it can not be doubted that with the increase of population and the necessity of producing the utmost quantity of food from the land, this operation will be carried to an extent which will produce a perceptibly beneficial effect on the climate.

The extent to which fruit culture can be carried in large cities is of course limited, but so far as it goes, the shelter afforded by high walls surrounding small gardens, accumulating warmth by day to be imparted to the air by night, has, in the oldest parts of the country, the same effect in rejuvenating old fruits as is possessed by the virgin soils of Kansas and

California. Especially is this effect noticed as regards the pear, which, to use the words of Van Mons, is "a tree of society and pleads to live in town." I have the past season seen the White Doyenne grown in the city of Boston, in perfection as regards size and fairness, and the Sweetwater grape is every year produced, free from mildew or other imperfections, in similar situations.

The indirect effect of large cities in advancing Horticulture—drawing tribute to their support from far and near, and returning more or less of refuse to fertilize the land, though not as wide as the sources from whence it is drawn—the stimulation given to Horticulture by wealth which desires its products, the accumulation of horticultural as well as other intelligence at such centers of all that is good and all that is evil, needs no more than passing mention. If it be true, as said by Lord Bacon, that "men come to build stately sooner than to garden finely," we can only expect Horticulture to arrive at perfection after the growth of great cities.

The extensive cultivation of fruit, by accumulating food for insects and fungus growth, which under such circumstances will multiply with far greater rapidity than when trees are scattered over a wide extent of territory, just as certainly as the trees themselves will thrive better in a fertile soil, than if compelled to range over twice or thrice the extent of meager soil, appears at first sight to defeat itself. I need not expatiate on the increase of codling worms, caterpillars, canker worms, curculios, and the legion of other insects from this cause. It is sufficient to compare New England with Kansas, or Ohio with California, to perceive the change which has taken place.

Progress in fruit culture is impossible without the introduction of new varieties of fruit, but in disseminating these we have hitherto been unable to avoid the dissemination of noxious insects and diseases. The introduction from Europe of the imported currant worm and the cabbage worm (*Pieris rapæ*), as well as of that longer-known pest, the woolly aphis, and other insects which have been mentioned here to-night, are notable examples of this.

The effect of cultivation on the duration of varieties deserves attention. Whatever we may hold in regard to the theories advanced by Knight or other writers on this point, it must be practically admitted that certain varieties of fruit, once of the highest excellence, have become worthless for general cultivation over a large part of our country, and no means of staying the progress of this deterioration are known to us. I must be permitted once more to mention that oft-quoted trio of worthies, the White Doyenne, Brown Beurré, and St. Germain pears. It is undeniable that these varieties are so subject to be attacked by fungus growth that their general cultivation has been abandoned, and it has been generally taught and believed that other varieties, cotemporaneous with them, have been discarded for the same reasons. But on recalling the observations which I have been able to make on varieties dating back, like the three already mentioned, two hundred years, (I do not mean to say that I have observed them for that length of time.) I find that the great majority have not degen-

erated in tree or fruit, but have been discarded for precisely the same reason as we are to-day rejecting new fruits, viz: inferior quality. Many of them are breaking pears, while our modern taste will be satisfied with nothing in the shape of a pear that is not either melting or buttery. Whence then the deterioration of these three kinds? The late A. J. Downing, who maintained that it was caused by continued propagation on unhealthy stocks and in unfavorable soils, might have found, in the fact that the superior quality of these varieties had caused them to be more propagated than others, an argument in support of that view, and I can not undertake to say that it has not at least a portion of truth. But I acccount for the failure of these varieties by their possessing a delicacy of organization rendering them peculiarly liable to injury by fungus growth, in precisely the same way as we find among the new varieties of American grapes those of the finest quality possessing a like delicacy of organization, rendering them subject to the attacks of rot and mildew, from which those of coarser leaf and more vigorous growth, but inferior quality of fruit, are free; just as the coarse breaking pears remain uninjured by the causes which have so much injured their compeers.

This subject is one to which it is difficult to do justice; not only from its breadth, but from the obscurity and intangibleness of the causes which have wrought the effects considered, and from the want of accurate and extended observation of them, though this deficiency will, no doubt, soon be remedied now that such societies as this and that of Ohio, as well as horticulturists generally, are awakened to its importance. The very idea of cultivation implies such processes, and such only as improve the crops cultivated, and if other results have followed, it only proves that some part of what we have called cultivation has been erroneous, or something has been wanting from it, and it is for us to search out the error or deficiency. There may be those disposed to point to the multiplication of noxious insects, and the scabby, spotted fruit in localities free from these defects only a generation since, and ask if these are the best results achieved by our horticultural societies, and all the other means of accumulating and disseminating horticultural information, which the activity of our age has set in motion; but I must look upon these as only temporary and incidental drawbacks, soon to be overcome by patient and persevering skill. We can not believe that the cultivation which has produced from the harsh and austere crab the delicious Northern Spy, and others which I might name, if there were need, and from the more harsh and austere and thorny wild pear such fruits as the Clapp's Favorite and Sheldon, and hosts of others—which has transformed the sloe into the Green Gage, and the dry and flavorless peach into a melting and delicious fruit—we can not believe that all this is to go for nothing, and its results all be lost, or be left to the tender mercies of the curculio and canker worm, any more than we can believe that all our civilization is to perish, and the red man re-occuppy our places. Civilization and culture must ultimately triumph over nature without culture. Even the insect tribes will be subdued, else the divine purpose

in making man to have dominion over every creeping thing that creepeth upon the earth is but a miserable failure.

At the risk of repeating ideas already expressed, I venture to state some of the practical lessons which may be drawn from this subject. And first it enforces the necessity of *true* cultivation, producing solid, not excessive growth, and healthy plants and fruits, and avoiding the over-cropping, which is one of the most fruitful sources of weakness and disease. It enforces the necessity of careful observation of those processes which are beneficial, that they may be repeated, and of those which are injurious, that they may be avoided, and of selection of the soils adapted to the different classes of fruit; of working so far as possible with nature rather than against her, for at the best the contest with nature in the cultivation of fruit is severe enough to tax all our energies.

Second, it enforces the policy of planting forest trees for shelter, and emphasizes the beneficial effect which they otherwise exert upon the climate. It gives me much pleasure to observe that the people in various sections of the country, and especially in the West, are becoming sensible of the importance, the absolute necessity of providing for the prodigal use of timber, and the planting of the vast areas of treeless prairie or desert.

Third, it shows the importance of the study of the habits of insects and of concerted, systematic, and general efforts for their destruction, and still more of preventing their introduction into new countries now exempt from their ravages. I notice in the catalogue of Kansas nurserymen, the statement that every new plant received is carefully examined with a magnifying glass and washed, to make sure that every insect or egg is destroyed—a most commendable practice, which, if it had been followed with the currant bushes brought from Europe, would have saved a world of trouble with the imported currant worm. Our watchfulness ought to be such that the first signs of a new insect or disease should be certainly detected and instantly trampled out like the rinderpest.

Fourth, we see more strongly than ever, the need of producing new varieties of fruit which shall combine the highest quality, with strong constitutions, capable not only of resisting the cold of winter, but the attacks of other more formidable enemies. Just as the civilized man is liable to a thousand diseases from which the savage man is exempt, so our improved varieties of fruit are subject to a thousand ills unknown to their wild progenitors. We can not for this reason give up these improved fruits, any more than we can return to the savage state because nervous diseases have increased, but we must continually remember that our finest fruits are to a great extent artificial beings, liable to the attacks of insects and fungus diseases exactly in proportion to their refinement, and consequently that the more their character is elevated, the more they need the constant care of art.

When a country ceases to be new, it also ceases to produce fruit with that spontaneousness and absence of care found in new countries, and we can no longer have perfect fruit without untiring watchfulness, system, and energy, but with these we can.

MR. TICE'S REMARKS ON MR. MANNING'S ESSAY.

Mr. President, The excellent paper just read, contains many suggestions affording food for thought, and deserving the most serious consideration; it also states certain physical facts, which can be satisfactorily explained by the operation of well known physical laws. I will instance of these latter, the fact that forest timber always shows a higher temperature than surrounding objects. The essay truly says, no adequate explanation has been given to account for this fact, though it is generally supposed to be owing to inherent specific heat.

In this fact itself, we may find the elements of a universal law of the physical world, whose knowledge may be of transcendent importance to us in our co-operation with Nature, for securing to ourselves the greatest possible amount of comfort and prosperity flowing from an ameliorated climate. Upon it may depend the solution of the problem, whether we can close the back door against the intrusions of those arctic storms, that now often sweep, in winter, with such fury and destructive violence from the north and northwest over the entire valley of the Mississippi. We ought then to investigate the nature and cause of this fact, and not remain satisfied by accounting for it by an untenable hypothesis. Holding as I do the opinion that it can be shown, incontestibly, that the higher specific temperature of forest trees than surrounding objects is the normal and necessary result of a great universal law, I undertake the task of explaining it.

But before doing so, it is necessary to state the facts, so distinctly and circumstantially that their characteristics will stand out in bold relief.

Some six or seven years ago I read somewhere (perhaps in the Annual Report of the Maine State Board of Agriculture), that certain experiments had been made in the forests of that state, to ascertain the relative temperature in winter, of different kinds of trees. For this purpose thermometers were inserted in auger holes bored in growing trees, both deciduous and evergreen, and the holes closed. When the weather was intensely cold the thermometers were examined, and those in evergreens invariably showed a higher temperature by from 8 to 10 degrees, than those in deciduous; and that the difference in favor of the evergreens increased as was the increment of the force of the wind. These facts show two things: first, a difference; and secondly, a variation of difference under changed conditions. It therefore overturns the hypothesis, that inherent specific heat is the sole cause of the higher temperature of trees; for if it were, then although there might be a difference in specific heat between different kinds of trees, yet this difference would remain invariable under all conditions. It is not then to an empirical, but to some universal law of Nature that we must look for a solution of the problem. In the conservation, correlation, persistence, and equivalence of the physical forces, we find this great law. Although this law is now generally accepted by both physicists and scientists, yet it is not as generally applied to the elucidation of physical phenomena as it should be and must be, if we are ever to be

enabled to comprehend the nature of these phenomena and understand their teaching.

But before that can be done, we must rise to the conception that Force is as indestructible as Matter; for as Matter can exist in three different states, solid, liquid, and gaseous, so Force can exist in different forms, as light, heat, electricity, magnetism, actinism, etc. Matter, under the influence of Force, can pass from one state to the other, and relapse into it again; and Force is constantly being converted from one form to another, and reverts into any or all of its forms. But neither Mattter nor Force can arise out of nothing, or relapse into it again. Every one, therefore, who accepts the doctrine of the conservation and persistence of Force, must accept the consequences that result from that dogma.

Of Absolute, Infinite Energy, I need not speak. Though it fills interstellar space, yet we can know nothing of it, excepting what is manifested to us through the relative and finite phenomena of Matter. All we know of Force is manifested to us through Matter; and since Matter is finite, so must its manifestation of Force be. The forces so manifested are light, heat, electricity, magnetism, and actinism or chemical affinity. Hence if these constitute a full inventory of the physical forces, then all motion, or other manifestation of Force in Matter, must originate in one of these forces. I differ with those physicists, who class Motion as a physical force. Matter is a force-bearer, and when it is affected by any force, it manifests that affectation to us by motion. Hence Motion is not a physical force, but merely a manifestation of force; and its momentum is the exponent of the physical force that produced it.

As Force is indestructible, the arrestation of Motion can not annihilate it. What then must ensue? Why, it must necessarily follow that when motion is arrested, an equivalent of force equal to the original force producing the motion must appear. This is found to be the case. The simplest experiment for illustrating this is the rubbing of the hands together. We immediately feel a glow of heat. The hands are put in motion by the muscles of the arms and body. The friction between the hands is the amount of resistance offered to the motion; therefore, the harder the hands are pressed together, the greater is the friction, consequently the more force is required to sustain the motion as more motion is arrested, and the more motion is arrested, the greater is the amount of heat evolved. Car-breaks are another familiar example of the arrestation of motion producing heat, the heat evolved being often so great as to set the breaks on fire.

If we extend our survey so as to include all cases where motion is arrested, we find the law to be universal, that the arrestation of motion produces heat.

In the great law we find not only the explanation of the phenomenon, why forest trees are warmer than surrounding objects, but also the explanation of the phenomenon, why there is a difference between the temperature of evergreen and deciduous trees. As the perennial foliage

of the evergreens offers greater resistance to the motion of the air, so we find they have the higher temperature.

Several years since, in an essay prepared for the Horticultural Society of my own state, I fully explained the operation of this great law, and, by the application of well known mechanical laws, showed the amount of heat evolved per second by the arrestation of the motion of currents of air having different velocities. While engaged on that essay, an intensely cold day occurred favorable for verifying the theory advanced in it, but which had not then, nor, as far as I know, has yet, met with a verification. Not having on my own premises suitable means of verification, I took a thermometer and went to the well-known botanical garden of our munificent citizen, Henry Shaw.

There is on the west side of his fructicetum a dense hedge of Scotch pine (*Pinus sylvestris*), planted in triple and quadruple rows. The hedge runs north and south, and is about twenty feet high and about as wide as high. The sky was overcast with a dense, unbroken cloud and the sun had not shone all day. The ground also had for several days been covered with sleet, ice, and snow, several inches in thickness. There was a brisk wind blowing from the west; and the time of day was between two and three o'clock in the afternoon; so that, if there was any solar influence, it was exerted in favor of the temperature on the west side of the hedge. I found on the west side uniformly a temperature of one degree below zero. Passing to the east side of the hedge, at some four or five feet from it, I found throughout a temperature of four degrees above zero, thus making a difference between the east and west side of the hedge of five degrees. On the northern extremity, the ground rises somewhat abruptly eastwardly. To test the modifying effect of the hedge, I carried the thermometer up eastwardly and found it gradually sinking. At some sixty feet from the hedge I still found it one stand degree above zero. I since regret that I did not make observations close to the sides and in the interior of the hedge. I have no doubt it would have shown still greater differences of temperature, since at the nearest distance (four or five feet), where I made the observations, I could feel the rebound of the wind that poured over the hedge.

The question now arises, what was the cause of the difference in temperature between the eastern and western side of the hedge? Unquestionably it was owing to the arrestation of the motion of the air, its motion being converted into heat. To put this air in motion, some force had been expended, whether heat, light, electricity, or magnetism, it matters not, for the immediate force arising in all cases of arrestation of motion is heat. But, then, heat can not affect matter without starting electric currents, nor can an electric current exist without magnetism at right angles to it. Again, magnetism develops electricity, and by electricity, light, heat, magnetism, and actinism are reproduced. Given any physical force, we can develop any and all the rest by its natural metamorphosis. Protean like, a physical force is ever changing its form, but never either losing its identity or integrity. This is the great law that unlocks the mysteries of Nature's economy in all her departments, and

by whose intelligent application we can not only modify climate, but all the operations of Nature.

Light falls upon the ocean; since it can not perish what becomes of it? A small portion is reflected, but since the bottom of the ocean is dark, what is not reflected must pass into some other mode of force. We know some of it passes into heat, by whose agency that immense amount of water which falls in rain, is evaporated. Again, light falls on the land surface of the earth. What becomes of it? A portion we know is reflected, and another portion we know is transformed into heat. But since earth currents are started under solar action, a portion of the light must also be converted into electricity. The electricity of the earth being negative as respects that of the air, it mounts the highest objects such as hills, trees, and mountains, so as to bring it in as close proximity as possible to the positive electricity of the air. The dry atmosphere being a non-conductor, neither electricity can pass through (unless by disruptive discharges), except by making a vehicle of matter for transporting it. Hence, the positive electricity seizes upon the aqueous vapor over the ocean, and the mutual electric attraction gives motion to the molecule of water thus affected. Hence, it is drawn from over the ocean to the continents, especially to the mountains, and is there condensed and precipitated as rain.

But once more: light falls upon vegetation. Here only a small portion is converted into heat, because the foliage of all vegetation remains cool. What becomes of the light in this case? We know under its influence, chemical action is started; water and carbonic acid are decomposed, and under electric currents and magnetic force, the hydrogen and carbon obtained is utilized in building up vegetable tissue, while the oxygen is let free. Animals, in digesting vegetable tissue, develop again the heat absorbed and fixed in growth. The conservation of force, by the mutual convertibility of its forms, therefore, is an endless chain that runs through and binds the physical universe together.

Here, then, is the great law that we must make available in all our dealings with Matter. By planting belts of timber, we not only apply the principle of this law to sheltering ourselves and our flocks against the rigors of winter, but we check the inroads of those arctic tempests, whose icy breath smites with paralysis and death our flocks, fields, and orchards.

Dr. WARDER said that he had been unwilling to accept the proposition that the specific heat of trees was of much value in raising the temperature of the atmosphere. Other well-known and often explained causes, he thought sufficient to account for the modifying influences which forests are known to exert.

Mr. DOUGLASS quoted Louden's assertion, that snow melted sooner on Norway Spruce than on any other tree; he also said that Mr. Meehan, who is good American authority, insists that evergreen trees emit heat, from the root upward, even when the earth is frozen solid around the roots. He referred to the fact that hyacinths have been known to grow,

emitting rootlets into frozen earth. He said that the ameliorating effects of forests are shown by the fact, that in Great Britain, double rent is paid for pasture lands which are sheltered by timber.

Mr. FLAGG stated that it is well known, that in Siberia, the roots of European larch and other trees, penetrate and grow in ground that is perpetually frozen.

PROF. TURNER said that he believed in planting trees, both evergreen and deciduous. He had put out on one of his farms 10,000 evergreen trees. He had offered to donate trees to the proper officers to plant along the streets in Jacksonville, and along the highways for several miles between one of his farms and the city. He contended that one of the imperative demands upon the present generation of dwellers upon the prairies is the planting and the care of trees.

Mr. BRYANT referred to his experience in tree planting at Princeton, commencing, in 1833, in the planting of that avenue of hard maples, which is now the admiration of all travelers along the highway which they border. He said he regarded the compliments paid him for this work not so much as praise to himself as they are a reproach to others who ought to have done as much or more than he has, yet have done nothing.

Dr. C. W. SPALDING read the following essay:

WILL THE USE OF WINE BENEFIT THE AMERICAN PEOPLE?

To this question, proposed to me by the officers of this Society, I answer, *yes;* but as in this age of inquiry, men are expected to give good and substantial reasons for the faith they hold, I shall, in this brief paper, endeavor to offer some of the principal reasons which lead me to give this affirmative reply.

Let us first notice some of the physical benefits which result from the use of wine. The climate of the United States, and especially that of the valley of the Mississippi, is noted for the prevalence of bilious diseases. Fevers of various kinds—fever and ague, dysentery, jaundice, etc., etc., are of frequent occurrence throughout its entire extent, from the Gulf of Mexico to the Lake of the Woods. Other diseases, entirely dissimilar to those commonly called bilious, are here more or less modified by becoming intermittent in type. Thus, under the influence of our climate, many diseases become periodic which do not have that character elsewhere, and nearly all assume more or less of the remittent aspect. Diseases of the class first mentioned are met with in all fertile countries, and prevail in proportion as fertility is accompanied by moisture, or by any climatic conditions which favor the rapid decomposition of vegetable substances. The conditions for development being favorable, and being likely for a long time to remain so, we may regard bilious diseases, in all their wide-spreading influences, as a permanent legacy, bequeathed to us by the soil and climate of the region we inhabit. Or, if any change in this regard is to happen in the future, it will take place so gradually

that many generations must pass away before any essential modification will become established.

It has been a favorite theory with certain writers on hygiene, that every country contains or produces within its limits the natural remedies for its most prominent diseases. I do not endorse this hypothesis, not knowing whether it is true or false, nor do I propose at this time to even discuss its merits. I merely state it in connection with a pretty well observed claim, which has often been asserted as the result of experience, namely, that the wines produced in any particular country, are best suited to the wants and needs of the people thereof.

Americans traveling, or temporarily residing in any of the wine producing countries of Europe, are frequently advised by medical men to drink the wines of the country in which they are sojourning, as being the best protection against the diseases incident to its climate, and also as a useful corrective where disease already exists.

The acids contained in our American wines serve as antidotes, not only to the miasmatic poisons which so generally prevail in all this region of country, but they also stimulate the action of the biliary system, which has become torpid under the influences of our debilitating climate. Numerous instances might be cited, where whole families have been preserved from bilious diseases, throughout the summer and fall, solely by a moderate but daily use of acid wines, while all around them typhoid and bilious fevers, and chills and fever, were almost universal.

Again, certain individuals who have practiced the use of wines have escaped disease, while other members of the same family who did not use them have been attacked. These and similar results have been observed over and over again, until the conclusions I have stated have been fairly reached. The evidence, therefore, does not rest upon the results in a few isolated cases, but the principle has been verified again and again. Thus the products of our soil yield a beverage pleasant to the taste and wholesome to the stomach, and one that has proved itself a wonderful palliative of, if not an absolute specific against, the various diseases begotten of our summer sun.

Medicines of some kind have been found necessary for the preservation of health with those who live in the unhealthy districts of our Great Valley. If, then, we are under the necessity of employing a remedy, which think you is most to be commended, a bottle of wine or a box of pills?—a glass of Concord or a dose of quinine?—a cup of Catawba or a spoonful of calomel and jalap? The one is inviting, and therefore likely to be taken in time; the other is repulsive, and hence only resorted to when the necessity becomes great. One leaves the head clear and the system free and elastic; the other shatters the nerves, poisons the humors, debilitates the powers, and leaves the man far more liable to disease than he was before. Which then shall we choose, wine or physic? Shall we dose ourselves with mineral and vegetable poisons as a remedy for diseases that are already upon us, or drink the fermented juice of the grape, and enjoy that immunity from our prevailing diseases, which is promised to him who uses it aright?

Perhaps of all questions relating to the subject under consideration, that commonly called the temperance question, more than any other, engages the attention of the public mind. All agree that temperance is a sterling virtue; and, on the other hand, no one doubts that intemperance is a great evil. But temperance is an avoidance of extremes. At one end of the series is drunkenness, at the other total abstinence. Certainly temperance can be neither of these, for temperance signifies moderation. The true philanthropist does not restrict the meaning of the term to the excessive use of strong drinks. In its application it includes eating, working, thinking, reading, equally with drinking, and extends to the indulgence of all the appetites and desires. In a word, it is applicable to every pleasure, and to every labor of life.

I am an advocate of temperance in its broadest sense; and I favor its widest, deepest, and its most searching application to every class of society, to every act of life, and even to every emotion of the human heart. But because men may and do become gluttons, shall we abstain from food? Because men may kill themselves with overwork, shall we cease from labor? Because men poison the very fountains of life, and destroy both soul and body by the excessive indulgence of certain passions, shall celibacy be imposed upon the whole human race? No! let him rather who has not sufficient self-command to assert his manhood, and to subject his appetites to an intelligent control, draw lessons from his daily experience, and learn to compel himself to such wholesome restraints in all the manifold duties and privileges of life as shall preserve him from excess, and lead him to a temperate life; for intemperance dwells only in the abuse and not in the right and orderly use of any of the blessings which God has vouchsafed to man.

The temperance movement of our time includes only that branch of intemperance which relates to the use of intoxicating drinks. The most zealous total-abstainer in the land is not more fully aware of the enormity of the evil, nor can he more deeply deplore its existence than I do. I know the suffering which it inflicts on society, and the misery it entails upon mankind. Yet if I were assigned the task of curing the world of drunkenness, I should look to the use of wine as a most important element in the forces I should feel bound to employ. I speak from experience as well as from observation, when I assert that pure acid wines do not cause that insatiable thirst for more, which comes of drinking distilled liquors. A man is as easily and as uniformly satisfied with a glass of pure wine as he is with a cup of tea or coffee; provided, always, that he does not inherit a taste for liquors, and that his taste has not been already depraved by the habitual use of distilled spirits. The people of wine-growing countries employ acid wines in place of both tea and coffee at their daily meals, with a decided advantage in physical developement in favor of the wine.

Men who have spent their lives in the vineyard and wine-cellar are remarkable rather for their abstemiousness than for the opposite. Can the opponents of the use of wines point me to a single instance where the use of acid wines only, has produced an inebriate.

I admit that whisky and brandy-drinkers will become intoxicated on wine when they can not get distilled spirits; but to prepare the way for such drunkenness, it is necessary that they already possess the love of, and the desire for distilled liquors.

The point I here make is, that in the main, distillation is the parent of drunkenness, and consequently, that those only who have a love for these strong drinks are likely to abuse the use of wine. Stop distillation, and in a single generation drunkenness would be almost unknown. But how can this be done ? is the question that immediately suggests itself. So long as the demand exists, a supply will surely be furnished. The experience of nations, and the history of the world, show that, right or wrong, men will indulge in the use of stimulating drinks. They have done so from the remotest times of which we have any authentic record, and will probably continue to do so for many generations to come. Any effort, therefore, which looks to an entire abolition of stimulants must, at this day, necessarily result in failure. Restrictive legislation has been tried without benefit. Moral suasion has, with few exceptions, reached that class of men only who need no reform. There remains, therefore, only one other method that has not yet been fairly tried, namely, the substitution of a beverage, the use of which shall not be open to the objections which are so justly urged against the use of ardent spirits. Such a substitute we have in the pure acid wines of our own country. As a means of lessening the consumption of distilled liquors, it is my firm belief that their general use would accomplish more than has heretofore been accomplished by all other means combined. If my premises are correct, should we not encourage their manufacture and their wide-spread consumption throughout the land.

When I speak of wines, I mean the fermented juice of the grape. I am no advocate of manufactured compounds, nor am I favorable to the addition of sugar and water for the purpose of increasing the quantity of the product. In unfavorable seasons the *must* may, and sometimes does, require an increase of the saccharine matter contained in the juice, but all such additions should be made with sole reference to improving the quality of the product, and not to an increase of quantity. We may boldly challenge the use of such wines with confidence that the result will inure to the moral as well as physical benefit of the American people.

Mr. DAGGY presented the following preamble and resolution, and moved their adoption by the Society, viz:

WHEREAS, There is a growing tendency in this country to introduce *wine* as a beverage, under the delusion of preserving health, or producing a temperance reform by substituting it for the intoxicating drinks now in use,

Resolved—That in the Grape for edible purposes, we find one of our choicest fruits; but in the manufacture of wine as a common beverage, we recognize a dangerous tendency to dissipation and excess.

He said that he was not willing the paper just read should go upon the records without a protest also accompanying it from himself and such and such other members as would vote for this resolution. He wished to

have this Society stand in its true position, on this subject before the people of the State.

He did not know whether a majority of the members of this Society agree with the views of the writer or not; if not, it would do no harm to adopt this resolution: and if they do, the minority certainly have the right to have their views made a matter of record. He did not wish to discuss the temperance question; that was not the proper place for such discussions. He did not present the resolution for such purpose, but hoped the vote upon it would be taken by calling ayes and nays.

Mr. McKinstry spoke to the same effect as Mr. Daggy, adding that he thought wine-drinking led to drunkenness; therefore wished to record his vote for the resolution.

Dr. Spalding said he was not there as a volunteer. He had been invited by the officers of this Society to prepare and read a paper upon the subject. He was only responsible for his own opinions, which were the results of many years of careful observation. If he had thought anything in this essay would tend to promote intemperance, he would certainly have not written it. It was clearly every man's duty to guard the morals of the community. The Society was not responsible for his opinions; and while he respected those of gentlemen who favored this resolution, knowing they resulted from a sincere desire to secure the well-being of Society, he was forced to conclude that they were based upon the well-known effects of those vile compounds, called wines, which have no just claim to the name, and to the use of which he was as much opposed as any one.

President Flagg said that Dr. Spalding was here by invitation to open a discussion upon this very important subject. The Society, as such, is not responsible for the views of any person, either uttered at its meetings, or written out, unless by vote it endorses such views.

All subjects directly related to Horticulture are legitimate matters for discussion, and each speaker or writer is entitled to have a fair hearing and to have his opinions made a matter of record. It is, and ever should be the object of this Society to extend equal courtesy to members upon both sides of every question upon which there are honest differences of opinion.

Dr. Humphrey thought the premises of the writer of the essay were not well taken, in one important point, viz:—that "some kind of stimulant was necessary in this climate." This is not a physiological fact. Our constitutions do not need either stimulants or drugs; they need food. There is no food in acid wines, such as the writer recommends. They may be better than drugs many times, if one were compelled to choose one or the other, but they can not make good blood; they can not build up bone, muscle, or nerve.

Prof. Turner spoke as follows:

Mr. President: I feel that I have a right to speak upon this question, for I am on both sides of it. I have always supported in action, sympathy, and by vote, the Anti-Liquor reform. I never keep or use as a bev-

erage alcoholic liquors, not because I do not love them, but because I always did love them, and therefore am, and ever have been, afraid of them; though I was never drunk in my life, and intend never to be.

Beside, in this present age of the world, an age corrupted and depraved to its very bones by that free flow of distilled liquors that everywhere abounded when I was a boy; an age still interfused, interpenetrated, and perverted by all the unnatural hereditary tastes of that unfortunate preceding age, I think the resolution offered by my friend on the left, "that the introduction of pure native American wine to our people is attended with danger," *is true;* great, imminent, and perilous danger; while still I believe every word that I distinctly heard of the able essay of my friend, Dr. Spalding, is also true.

Mr. President: from Noah's day to our own, the human race has been encompassed with dangers, great, appalling, and unavoidable dangers, on this and on many other sides; and we can not avoid them if we would, and ought not to if we could, except in that very way that God, our Heavenly Father, has provided: by personally meeting them and personally resisting them.

This is the necessary and inevitable, and I will also say the most beneficial trial, or rather elaboration of our personal virtue; and without just such a school appointed by our Heavenly Father for our trial and our good, all virtue would be a self-evident impossibility.

By that voice of authority to which alone of all beings or associations of beings that ever trod this earth of ours, I am, by the very constitution of my mind accustomed to bow in devout deference, in spite of all possible human opinions, laws, usages, customs, or resolutions, in church or in state, we are taught to pray evermore, that we may not be personally led into these temptations, and not that these temptations may be annihilated by law or otherwise, so long as we are left personally free to choose and to resist them.

Freedom here, therefore, as everywhere else, is our grand, American remedy; free thought, free action, free choice, free discussion everywhere.

I am glad, therefore, that Dr. Spalding has expressed to us freely his opinion. I am as glad, also, that those of a different opinion should give us theirs. But I regret that either side should throw their opinions into the form of a resolution requiring the vote and the decision of this Society. It is unusual and unnecessary. This Society is not convened to vote up or vote down questions of morals, or of religion, or of policy.

Still, we do raise *grapes*, and must decide what as good citizens we may and what we may not do with them; not by any vote of this Society, but by free discussion, and then allowing each man in the Society, and all over this free land, in the light of this discussion, to decide for himself. I am not responsible for what Dr. Spalding chooses to say in this Society, nor is any other man; neither is this Society—and I have no doubt that Dr. Spalding is exceedingly thankful that he is not—responsible for all that I may say. But it is dangerous, it is said, to throw his unendorsed opinion out to the world.

Is that so? Is all the wisdom of this continent assembled in this hall? Will not this great American Republic know as well as we know what to think of Dr. Spalding's opinions, unless this infallible Society first votes and instructs them what to think? It may be the vote of this Society is infallible, but I doubt it.

What then is Dr. Spalding's offense? precisely the same as the offense of the Savior of men on this same point: pure bread and pure wine He continuously used himself. The only two things he wrought a miracle to produce were pure bread and pure wine; better than the common sort, as our good doctor proposes; so much better that men craved it, even after "they had well drunken" of the old. The only two things He gave the world, as a perpetual memorial of Himself and of His peculiar inspiring and regenerating power, for all ages past and to come, drunk or sober, were pure bread and pure wine; and so long as I remember the Savior of men I can not smite the author of this essay with a very hard fist, or a very hard vote.

I have well read and well considered all that miserable twaddle of special pleading, by which we are to believe that the commended wine of those days was not intoxicating; an argument to prove that they did not make bread of flour in those days, would be just as conclusive.

A man's language, really and necessarily means only what he knows it will be understood to mean, by his own hearers and in his own age.

Now, for hundreds and thousands of years, by all the millions who ever read the Greek Testament, this new interpretation of the text was never dreamed of. Did the Savior of men then really and practically lie to all these generations of men who have gone before us, in order that He might teach our ultra-temperance men a doubtful truth now? This is indeed, "a hard saying; who can hear it?"

No: He meant that we should personally and individually meet this great danger of human life and necessary human responsibility, and personally vanquish it, each for himself alone, as He did. This is the only possible solution either of His words or His acts. He drank wine, but He did not get drunk; nor should we. He made and commended pure bread and pure wine; and so may we. He neither made nor commended bread with arsenic in it, or wine with strychnine or rot-gut whisky in it, neither may we; at least so says Dr. Spalding, and so I say. Others may be of different opinion.

But, after all, I must correct Dr. Spalding on one point.

He talks about our foreign wines that come over the salt water. But, Mr. President, not one-hundredth part of our "foreign wines" ever smelled salt water. They are manufactured out of our rot-gut whisky, strychnine, log-wood, etc., etc., in New York and our other great cities, and put into foreign and counterfeit casks and sold for pure wine. Dr. Spalding, no doubt knows this better than I do; and it is these vile and miserable compounds that he proposes to supplant with our pure American wines, notwithstanding that the attempt, with our present depraved American tastes and habits, may be and will be attended with those great and appalling dangers and evils which the resolution sug-

gests, and which his paper fully and distinctly admits and deplores.

Mr. President, let us all speak our honest opinions upon this as upon other subjects. Let us have free discussion, and leave the great world to judge of it in the same freedom, without any attempt on our part to vote one another up or down, or to instruct the big world of mankind how they shall or shall not decide the case.

Beside, any even pretended opinion of this Society, on either side of this general question, would be but a sham; for the plain truth is, this Society has not and can not have any settled opinions on the subject. Some of its members think one way and some another, and will, if we discuss it till next year at this time.

To tell the world that it has a fixed opinion, when it has none, upon a point which it is under no necessary or constitutional obligation to vote upon or decide either way, is only and simply to tell the world a quite fashionable, it is true, but nevertheless, a real and practical lie. We can never humbug intemperance or any other great practical evil out of sight by any such legerdemain.

What does the big world care, or what need it care for what we, in this room think, any further than we are able individually and severally, to give a good reason for our thought?

I am, therefore, in favor of free discussion here and everywhere, but against all votes and all resolutions of whatever sort, outside of those we are compelled to vote upon by our own chosen constitution and laws.

This Society is neither an ecclesiastical, nor a legislative assembly, nor yet a club, assembled to debate for victory. It is simply a gathering for the free expression of personal opinion on those beautiful and humane topics of our practical art, which, in their wide-spread relations, reach out over all morals, all legislative acts, and all religious opinions. But we do not propose to settle, by our *great vote*, all those incidental topics and interests over which our wide and beautiful art spreads, or through which our free discussions must necessarily and inevitably range.

I go in, therefore, for the discussions without either votes or resolutions on all such topics; leaving the Society uncommitted.

Dr. HULL was glad the subject had come up for discussion. He was, and had always been, a temperate man; did not use any kind of fermented drinks or distilled liquors habitually, yet he was convinced that it would be a great improvement upon the present state of things if pure, native wines could take the place of distilled liquors and all the abominable compounds called wines, which were poisoning and degrading the American people.

He had never yet known an instance in which the use of pure acid wines caused drunkenness, and he hoped for a reform through the substitution spoken of in the essay.

Mr. SHAW said he had always found it a safe practice in his family to keep and use pure wine.

Dr. SPALDING would not introduce the Scriptures here to prove the positions he has taken. He revered the Scriptures, and if the time and

place were proper, he could show from the whole tenor of the Bible from one end to the other, that the use of such wines as he recommended was not only not forbidden, but their proper use sanctioned.

Dr. PENNINGTON said he had never used wines, or kept them in his family. He regarded the habitual use of any alcoholic drink as fraught with danger. He had found the diluted juice of lemons, taken ice cold, to answer the ends which the doctor would accomplish with acid wines.

Mr. BLISS thought this Society should take a stand upon this question. Its published reports convey the impression to the reader that it favors the manufacture and use of wine. He did not favor its use, and agreed with the sentiment expressed in the resolution.

Mr. EARLE:

Mr. President:—I occupy on this question an attitude of entirely calm but earnest inquiry. I want more light; and it is of vast importance to the interests of human nature that more light be given us on this wine question. It seems to me that our Society, as well as most of the horticultural societies of the country, has, in its numerous exhibitions, reports, and discussions, and other encouragment given to the production of native wines, assumed a position of very grave responsibility to the people—to society at large; and it has seemed to many of us to be quite time to justify our active encouragement of the wine interest, by such an amount of facts and arguments as would fairly remove the impression existing in many minds, if that be possible, that we are giving the great influence of our society to a system which tends to the moral damage of community. Hence I favored the invitation to our able friend from Missouri, to come here and state the grounds upon which American wine growing is recommended as the proper remedy for the evils of intemperance. I do not believe it is the province of this Society to discuss the question from a physiological standpoint, but we may investigate it as a question of social science; we may inquire what has been the result of general wine using among those peoples where it has been common for ages. Dr. Spalding asserts very positively in his paper, that there is no tendency to excess in the use of pure acid American wine; that it may be used habitually without any increase of appetite for itself, or any creation of appetite for distilled liquors. I hope the Doctor's position is well taken. I do profoundly hope that abundant facts justify that assertion. But he has not given us the facts, as I hoped he would; and while his simple statement has great weight with me, I must in so important a matter ask for more proof.

I do not believe that we have the necessary experience in this country upon which to base this opinion. The personal experience of our distinguished friend is not enough; his observations in the limited circle of men who have for some years used American wines is not enough; this is all limited to a narrow district, and to a single generation. It is valuable evidence as far as it goes, but it is far too limited to justify our taking any position of influence on this great question.

My friend on the left has alluded to the cider drinking experience of a part of our people as evidence favorable to the wine theory of reform; but it seems to me that this is a very unfortunate evidence for that side. It is true we have had several generations of cider drinkers in this country, but I believe it is true that cider drinking never restrained men from the use of distilled spirits, but always excited an appetite therefor; and more than this, it has in itself caused an immeasurable amount of intoxication. I was myself raised among the green hills of New England, and I know whereof I speak; and I know that it was the common remark in my neighborhood, that cider drunkenness was the most degrading and beastly of all forms of inebriety. But I know that cider is not wine; it differs from it essentially in its chemical constitution, and doubtless also in its constitutional effects. I only allude to cider here, because our friend* unluckily used it as an argument for wine.

But what we want in considering the question of the probable influence of wine drinking on the American character, is to know what that influence has been on the character of other nations. In some of the States of Europe, wine has been the common beverage of every day, of all classes of the people, for hundreds of years. We want reliable evidence of the general results. How does the temperament, the moral character, the civilization of these peoples differ from the same characteristics of those communities which have drunk little wine? We have some testimony on this point, but much of it is conflicting. I shall be glad if our discussion to-night shall lead to a more thorough, impartial, and exhaustive investigation of this subject; that we may be more wisely guided in our course regarding this most important subject. I am not willing that this Society shall act decisively at this time on the resolution of my friend Daggy, and I move the reference of the whole subject to a committee of five.

Mr. SHAW moved to lay the whole subject on the table.

Lost.

The question on Mr. Earle's motion was taken by a standing vote, and largely prevailed.

PROF. BURRILL moved that the report of the Committee shall be confined to facts, not opinions.

The motion was lost.

Mr. GALUSHA moved that this Committee be instructed to report at the next annual meeting. He said that the importance of this subject, both in respect to its immediate results and its far-reaching and wide-spreading influences, demands that we shall not act rashly or unadvisedly upon it.

The time for closing the present session was near at hand, and it was impossible that a committee could, in the short time left them, calmly and thoroughly look over the vast field to which this resolution will introduce them, so as to point out the best practical course for this Society to pursue. He knew the President would select five men in whose good

*NOTE.—The speaker referred to, was not distinctly heard by the Secretary.

judgment, in whose devotion to the interests of this Society and in whose integrity of purpose to seek the highest good of their fellow men, we will all confide. Let us give these men time to look at this subject in all its bearings, and they would, no doubt, present a platform upon which all members can stand and act in harmony.

This motion prevailed.

The President subsequently announced the committee, viz: Parker Earle, of South Pass; Lewis Ellsworth, of Naperville; D. W. Scott, of Galena; Jonathan Huggins, of Woodburn, and A. M. Brown, of Villa Ridge.

On motion, the Society adjourned till to-morrow morning.

FRIDAY MORNING.

The Society met at the usual hour, President Flagg in the chair.

Mr. EDWARDS, President of the Northern Illinois Horticultural Society, read the following notice, adding his own personal invitation:

Mr. President:

On behalf of the Officers and Members of the Northern Illinois Horticultural Society, an invitation is extended to the members of our State Society to meet with that Society at Rockford, on January, 24, 25, and 26, 1871. The usual Railroad facilities will be afforded, and the cordial hospitality of the citizens of Rockford is extended.

D. WILMOT SCOTT,
Corresponding Secretary.

Mr. JACKSON, of Benton Harbor, President of the Horticultural Society of Western Michigan, read the following:

On behalf of the Horticultural Society of Western Michigan, our hearty thanks are hereby tendered to Dr. Hull, your worthy State Horticulturist, for the valuable services rendered our Society by his recent visits and lectures.

W. H. RAGAN, Corresponding Secretary of the Indiana Horticultural Society, invited the members of our Society to attend the annual meeting to be held in Indianapolis, on Tuesday, Wednesday, and Thursday, the 3d, 4th, and 5th days of January, prox.

E. DAGGY, President of the Illinois Central Horticultural Society, invited the members of the State Society to the meeting of that Society, to be held at Carlinville, February 7, 8, and 9.

The Committee on *Horticultural Education*, through Mr. McClelland, Chairman, reported as follows:

Your Committee, to whom was referred the resolution in regard to the advancement of Horticultural Education in our institutions of learning, have given the subject what consideration they have been able in so short a time, and on account of the great importance of the subject, and the necessity of maturing some feasible plan which will promote its great ends, would recommend the appointment of a committee of three, to prepare an address to the people of Illinois, and to be published in the Transactions of this Society, calling attention to the importance of introducing into all our schools, the study of practical horticulture, arboricul-

ture, floriculture, and landscape gardening, with botany and geology, as a means of improving, elevating, and refining our industrial population.

J. S. McClelland,
S. Shepherd,
J. E. Porter,
Committee.

The recommendation of the Committee was adopted, and on motion, the same Committee was continued for the purpose specified.

The Committee on the Terminology of the Grape-vine reported, through its chairman, as follows:

TERMINOLOGY OF THE GRAPE VINE.

To the Illinois State Horticultural Society:

Your Committee, to whom was referred the subject of "Terminology" of the Grape-Vine, would respectfully submit the following for your approval:

"*Roots*"—That part of the vine growing below the surface of the ground.

"*Stem*"—The main stock below the branches.

"*Arm*"—A branch permanently trained in a horizontal position.

"*Shoot*"—Green wood. This consists of "Fruit Shoots," "Young Canes," and "Suckers."

"*Lateral*"—A branch from a shoot.

"*Cane*"—A ripened shoot, grown from the stem, arm, or spur.

"*Spur*"—A cane cut short.

"*Joint or Node*"—The enlarged part, whence come buds, leaves, and tendrils.

"*Internode*"—The part between the joints.

"*Tendril*"—The twining support.

J. E. Starr,
For the Committee.

The report was adopted.

Dr. Warder presented the following, which was received:

FRUIT COMMITTEE'S REPORT.

We find quite a large display of apples, many of which are of high quality, well grown, and generally well named, giving an evidence of the advance of Horticulture and of horticultural knowledge among us, which is truly encouraging.

We find the following on exhibition:

By Wm. T. Nelson, Wilmington:

Fifteen varieties of apples, including *The Nelson*, a handsome, large, sweet apple, a long keeper. This fruit was described in the *Journal of Horticulture* about two years ago.

Mr. Nelson also showed the *Grimes' Golden*, and his specimens of

White Winter Pearmain are very smooth and fair; the *Winesaps* are of large size, and said to have been taken from an old tree.

By S. G. Minkler, Oswego:

His own seedling, the *Minkler*, in its perfect state, and another variety unknown.

By E. C. Hathaway, Ottawa:

Four varieties, including "*Hubbell*, or Bethlemite," which seems not to be the Bethlemite of Ohio.

By A. C. Hammond, Warsaw:

Twenty-four varieties, including many choice kinds, well named; also a seedling from an old orchard—tree thirty years old. Fruit large, handsome, splashed carmine; flesh tender, very juicy; flavor peculiar, sub-acid; quality good. Also an apple marked "*Red Winter Sweet*," which is very rich, sweet, and a keeper—unknown.

By J. B. Phinney, Champaign:

Sudbury Sweet, and another unknown.

By S. S. Ebersole, Ottawa:

An unknown small red apple; said to be a very healthy and productive annual bearer. The fruit continues in eating condition from September till June. Flavor sweet; not very fine.

By M. L. Comstock:

One variety unknown, medium size, red, very good; unknown to the Committee.

By E. Childs, Oneida:

Two varieties—His White Winter Pearmains are very smooth and fine.

By L. Flaherty, Galesburg:

One variety, unknown.

By D. B. Wier, Lacon:

Five varieties, among which his *Willow Twig* is very large and fine. We also find a new Siberian apple, which is called the *St. Paul*—some of these are full medium size, others small, so that the variety appears to be variable in this respect. Fruit globular, slightly conical, regular—surface smooth, red, faintly striped—flesh yellow, breaking, juicy, having the true Siberian flavor.

A sample of jelly made from this fruit gives evidence of its adaptation to this purpose.

By N. Overman and Sons, Canton:

Some fourteen varieties in quantity and great perfection. Among these are *Fulton*, still in good condition, and *Ortley*, free from scab.

By Adams County Horticultural Society:

Twenty-one varities, making a very fine display of well-grown fruit. The White Winter Pearmain is very fair. We here find apples named "*Northern Spy*," and "*Domine*," which we believe to be incorrectly marked, though unable to correct the labels.

By O. B. Galusha, Morris:

A fine apple marked "*Seedling*," from P. Collins, of Grundy Co., thought to be the *Large Striped Pearmain.*

By S. Jackson, Benton Harbor, Mich.:

Four varieties.

By B. M. McKinstry, Kankakee:

Twelve kinds.

By J. N. Ridings, Grundy Co.:

"A Seedling," said to be a keeper—fruit sadly wilted and not in condition for a test.

By C. N. Bennett, Pontiac:

Eight varieties for names.

By A. Calkin, Woodhull, Henry Co.:

A seedling from Columbia Co., N. Y. Said to be very hardy and productive; ripens in December—not known.

By W. Durley, Hennepin:

Eight varieties, including good specimens of *Jonathan.*

By Dr. Humphrey, Galesburg:

A noble collection of twenty-seven varieties from Knox County, which give a fine showing of her apples. These have been well selected, and handsomely presented in profuse abundance.

The *White Winter Pearmain* is here larger and fairer than in any other collection. The *Ortleys* are remarkably fine and fair. The *Domine* is unusually smooth and handsome. The "*Red Winter Sweeting*," a fine looking fruit—said to keep well—is not known to us. The "*Sweet Romanite*" is the *Kentucky Sweet*, as we suppose. The "*Red Winter Pearmain*" is believed to be *Ben Davis.*

By A. R. Whitney, Franklin Grove:

Some large and handsome apples from Kansas, including the *Rawles' Janet* and *White Winter Pearmain*, both very large and fine; also specimens of his seedling Siberian apples, including Nos. 25 and 12½, both good keepers. The latter is of full, medium size, globular-oblate, angular; surface smooth bright red on yellow, with distinct splashes of carmine on gray shading; dots few, minute, indented; basin rather deep, abrupt, a little folded; eye closed; cavity deep, acute, wavy; stem variable in length, slender. In form this beautiful fruit looks more like the common apple than the Siberian.

PEARS were represented by a single specimen of the old *Pound Pear* brought from California.

PLUMS were exhibited by Joseph Fuller, of Ottawa, in alcohol, which were intended to show the benefits derived from the use of Dr. Hull's Curculio-catcher—a long branch crowded with fruit of *Blue Gage.*

Signed,

W. H. RAGAN,
A. G. HUMPHREY,
SAMUEL JACKSON,
A. R. WHITNEY,
JNO. A. WARDER.

Mr. ELLSWORTH moved that, in view of our financial condition, we dispense with the services a State Horticulturist, during the coming year.

Mr. BROWN moved to amend the motion to the effect that if the Society receives an appropriation of $3,000 from the State, then the Executive Committeee may employ a State Horticulturist at its discretion.

The amendment was approved, and the motion, as amended, ADOPTED.

Mr. WIER offered the following resolution, which was adopted:

Resolved, That W. C. Flagg and William Reddick, members of the State Senate, and James Shaw, member of the House of Representatives, be a Special Committee to look after the interests of this Society at the next session of the General Assembly.

The Committee on Final Resolutions presented the following, which were unanimously adopted:

Resolved, That the thanks of this Society are hereby tendered to the officers of the following Railroad Companies for facilities extended to the officers of this Society and the members of the *ad interim* Committee by passing them over their respective roads when in the prosecution of their official labors, viz: The Illinois Central; Chicago and St. Louis; Chicago, Rock Island and Pacific; Chicago, Burlington and Quincy; Toledo, Peoria and Warsaw; Indianapolis, Bloomington and Western; and the Mobile and Ohio.

Resolved, That the thanks of this Society are hereby tendered to the officers of the following Railroad Companies, who have returned members, attending this meeting, at the usual reduced rates: Chicago, Burlington and Quincy; Chicago, Alton and St. Louis; Illinois Central; Chicago, Rock Island and Pacific; Chicago, Danville and Vincennes; Burlington, Cedar Rapids and Minnesota; Indianapolis, Bloomington and Western; Chicago and Northwestern; Peoria, Pekin and Jacksonville; Rockford, Rock Island and St. Louis; Burlington and Missouri River; Toledo, Peoria and Warsaw.

Resolved, That the thanks of this Society are tendered to the retiring President, Hon. W. C. Flagg, whose active labors have done so much to further the interests of this Society; and to the other Officers and Committees who have more generally, than usual, performed the duties allotted to them, and done their work so well.

Resolved, That the thanks of this Society are most cordially tendered to the gentlemen from other states who have so interestingly addressed us during this session, namely: Dr. John A. Warder, of Cincinnati, O.; Robert Manning, of Salem, Mass.; Dr. C. W. Spalding, of St. Louis; J. H. Tice, of St. Louis, and C. V. Riley, of St. Louis; not forgetting the many valuable contributors from our own State.

Resolved, That this Society extend to the citizens of Galesburg their cordial thanks for the generous hospitality that has been extended to its members, in entertaining them at their homes and firesides; also, for the furnishing of ample and comfortable quarters for holding the sessions of this Convention.

Resolved, That it is with much pleasure and satisfaction that we observe an increased attendance of ladies at our annual sessions, and especially at the present one; and we trust the satisfaction it has afforded them is equal to the pleasure it has given to the members of this Society.

Mr. GALUSHA, from the Executive Committee, announced that the Committee *Ad Interim* for the ensuing year would consist of A. M. Brown, of Villa Ridge; E. Daggy, of Tuscola, and A. R. Whitney, of Franklin Grove.

President Flagg requested Mr. Ellsworth to give his views as to what laws should be passed by our Legislature to encourage tree planting.

Mr. Ellsworth replied that he would favor offering a premium for the planting of forest trees. The money expended by the State for this purpose would be many times returned in the increased amount of revenue that would indirectly flow back into the treasury from the benefits of the trees.

Mr. Shepherd thought that the object could be better accomplished by aiding such Societies as ours sufficiently to enable them to publish large editions of their transactions for gratuitous distribution. This would enlighten the people upon the subject.

President Flagg thought that a small bounty—say a half cent for each hard-wood tree planted, provided a sufficient number planted to produce any valuable results, would be sufficient to offer, and that the offering such bounties would be a proper course. He would have the county, in which the trees stood, pay the bounty.

Mr. Ellsworth agreed to this. The influence of our reports and our examples are good in this direction to direct the way, but it is "money that makes the mare go." The State can well afford to pay a bounty to encourage tree planting.

He moved that the Committee appointed by the supplementary report of Judge Brown, be instructed to report a bill to the President of the Society for presentation to the Legislature, at its next session, to encourage tree planting; which was agreed to.

Mr. Hale moved that an additional member of the Ad Interim Committee be appointed, whose duty it shall be to report upon the special subjects of Ornamental and Landscape Gardening.

The motion was sustained, and the Executive Committee soon thereafter announced T. J. Hale, of Galesburg, as such member.

Mr. Ellsworth said that the members of this Society have been pretty well drilled in the so-called practical departments of Horticulture, and he now wished to see more attention paid to the ornamental part of our art.

Prof. Turner said that we, of necessity have been engaged upon these rudimental portions of our art. We have been making the bones and the muscle, the general structure of our Society, and now we should put on the feathers—let us now begin to adorn it.

Mr. Ellsworth—In our grounds we have always more or less of flowers. Nothing brightens the eyes of children more than the sight of beautiful flowers. Every autumn, at the approach of frost, we allow the children to pick freely. This practice tends to increase their interest in flowers.

Mr. Hale thought that the ladies would attend, and take part in our discussions upon flowers, if we were to give the topic of floriculture a place in our proceedings.

He offered the following resolution, which was adopted:

Resolved,—That the Ladies of the State of Illinois, and of the adjoining States, be cordially invited to attend the next, and all subsequent sessions of this Society.

PROF. TURNER—If we want the ladies to attend our meetings we must have the vacant places upon the stand filled with flowers and plants. We can not talk so badly that they would stay away from such attractions as these would present.

SECRETARY GALUSHA said it was a source of deep regret to him that the ornamental department of our art had not received its due attention at this meeting. He had engaged an essay from one of the best of Western landscape gardeners; also one from Illinois' leading florist, Edgar Sanders, of Chicago; but both these gentlemen had failed us, though not without substantial reasons, probably. He would pledge that at the next annual gathering such a disappointment would not recur.

The following question was sent to the Secretary's desk, as a topic for a half hour's discussion, viz: "Are house-plants in a room deleterious to the health of the inmates?"

Mr. ELLSWORTH—From my observations for many years, I do not think plants in a room are injurious. It is quite probable, as it is claimed, that cut flowers may be so. A distinction should be made between growing plants and cut flowers, since the exhalations are chemically different.

Mrs. Prof. STANDISH is accustomed to keep house-plants in her sitting-room, and has never perceived or suspected any injurious effects resulting from the practice.

Mr. HALE—Persons who cultivate plants in the house do not often have cut flowers in the same room with them. He was aware that there exists a wide-spread prejudice against plants in living-rooms, but thinks it is not well founded.

Prof. TURNER—When the earth was fitted up, there was perhaps a time when the atmosphere was surcharged with carbonic acid gas to such a degree that the higher order of animals could not exist upon it until plants had been developed to absorb the surplus of carbon. There may be danger to persons affected by tubercular disease from an accumulation of moisture in a room where many plants are kept and frequently watered, as such persons should breathe a dry atmosphere. When we specify plants, we find that there are some whose odor, while in bloom, is deleterious.

Mr. HALE has kept plants in his sitting-room for years; thinks it important to have good ventilation, as rooms containing plants are kept too warm, usually, and thinks this accounts for the impression that the plants themselves produce a deleterious effect.

Mr. WIER thought that the decaying vegetable substances in the soil in the pots might affect the air of a room injuriously.

Mr. HALE—This may be so, but it can be obviated by mixing a little charcoal with the soil.

Prof. TURNER called attention to the fact that dry earth was one of the very best absorbents of noxious gases.

THE SECRETARY, from the Executive Committee, announced the standing committees.*

Mr. HALE, on behalf of the Galesburg Horticultural Society, and of the citizens of Galesburg, returned thanks for the favor conferred upon them by holding the meeting of the State Horticultural Society in this place.

PRESIDENT FLAGG responded that it is a source of gratification to the members of this Society to know that their presence and their counsels are of value to the horticulturists of the place where the annual meetings are held; and in behalf of the Society, he could assure the good people of Galesburg that their kindness to us is fully appreciated.

On motion, the Society adjourned.

MEETING OF THE EXECUTIVE BOARD.

A meeting of the Executive Board of the Society was held at the Union House in Galesburg, Dec. 16, 1870, at which the following Standing Committees for the year 1871 were appointed:

METEOROLOGY—James W. Tolman, Wm. M. Baker, John H. Tice.
GEOLOGY AND SOILS—J. Shaw, W. F. Bliss, H. C. Freeman.
BOTANY AND VEGETABLE PHYSIOLOGY—H. H. McAffee, T. J. Burrill, George Vasey.
ENTOMOLOGY—Wm. Le Baron, C. V. Riley, T. E. A. Holcomb.
ORNAMENTAL AND TIMBER TREES—Samuel Edwards, J. W. Fell, Geo. W. Minier.
FRUIT PACKAGES—H. D. Emery, E. A. Reihl, P. R. Wright.
TESTING NEW VARIETIES—J. W. Cochran, Samuel Edwards, D. B. Wier, M. L. Dunlap, B. Pullen, H. J. Hyde, P. R. Wright.
AD INTERIM—A. M. Brown, E. Daggy, A. R. Whitney, T. J. Hale.

The Secretary was instructed to purchase from C. V. Riley, electrotype plates, in amount not exceeding thirty dollars, to illustrate his paper on Snout Beetles.

The following bills were allowed and warrants ordered to be drawn on the Treasurer for the several amounts:

Express Company	$ 21 50
J. S. McClelland, for Printing and Posting Bills	10 00
Robert Manning, Expenses	75 00
O. B. Galusha, for balance due	207 08
Dunlop, Reade, & Brewster, for advance payment on contract for printing Transactions	200 00

*NOTE.—The list of these committees may be found in its proper place at the beginning of this volume.—*Secretary.*

REPORTS AND PAPERS

SENT TO THE SECRETARY FOR PUBLICATION, BUT NOT READ AT THE ANNUAL MEETING.

SECOND ANNUAL REPORT OF THE STATE HORTICULTURIST.

TREES INJURED BY THE OCTOBER FREEZE.

Over a very large part of the central and northern parts of the State, great numbers of trees, both evergreen and deciduous, were, the past spring, found to be incurably diseased or much damaged. The following, which we published in the *Prairie Farmer*, fully explains the cause:

Mr. J. R., Galesburg, Ill. The box was duly received containing samples of Norway Spruce, White Pine, and Red Cedar, some of which you say were taken from trees twenty feet high, and which died the past spring. We have devoted much time inspecting each sample, but can find no evidence of disease on any of them. However, on all the young shoots or branches of last year's growth, scarcely a bud had been formed near the ends. On all, the large terminal bud, usually so conspicuous on matured shoots, was wholly wanting, or but barely perceptible. This proves to our mind that trees from which these specimens were cut were growing freely up to the time of the October freeze, which arrested their growth.

This it seems to have done on evergreen trees without lifting or cracking the bark, as was common on many deciduous plants, of which the Osage orange, in nurseries, and in some hedge rows, are examples now familiar to all north of 42 degrees. We are glad to know that only a comparatively small per cent. of trees were killed, and that many are wounded only in the top. Possibly a hundred years may elapse before causes will again combine to produce a like destruction in either evergreens or deciduous trees.

ORANGE RUST OF THE BLACKBERRY.

Whoever has been careful to observe has seen an occasional bush of the wild blackberry with the under side of its leaves covered with a yellowish dust, or orange rust, as it is now called. Probably but few are aware of its blighting effects on the cultivated blackberry, and much less of the extent it is spreading over the country. This rust is no new thing; to our certain knowledge, it has existed in the neighborhood of Alton, on wild blackberries, in old fields and in the forest, for upwards of twenty years. It has not, however, so far as we know, attracted much

notice in the above-mentioned locality on cultivated blackberries until the past few years; indeed, the first patch wholly killed, or made unproductive by it, of which we have any knowledge, was one owned by Mr. A. S. Barry, near Godfrey Station, five miles north of Alton. From such facts as we are able to obtain of this patch, it is probable that at first it appeared only on a few bushes, but afterwards spread so that at the end of the second summer all the canes were either killed by it or made unproductive.

Of late we have met with this disease on cultivated blackberries in several localities in the West. In all of which, judging from the rapidity it is spreading, it is to be feared that whole sections of country may yet be swept by it. So contagious does it appear to be, that we believe that not more than three summers will be likely to elapse, after it appears in a plantation, before all the bushes in it will be made unfruitful. But where the bushes mature the fungi, and it is allowed to remain to scatter the seeds, it does not appear possible that a plant could escape its blighting effects to the end of the second season. That the reader may form his own opinion with respect to its contagious nature, we will give a brief history of our own blackberry patch, together with experiments and observations of this rust as we have found it elsewhere.

To set our patch, we obtained roots enough from the most vigorous part of the Godfrey plantation, before mentioned, to set two acres. At the time we took our roots, Mr. Barry, nor any one else, had supposed that his bushes were diseased, only that the patch became unproductive by peach trees growing up and producing an excess of shade, or had exhausted the ground too much. Our roots were set on ground recently reclaimed from the forest. On this new land the roots pushed up young canes with great vigor. In the month of July, however, on perhaps a hundred shoots last formed, the young leaves had a crimped appearance, with a perceptible tinge of yellow. This yellowish cast deepened daily for from six to eight days, when the under sides of the leaves were covered with a deep colored orange-rust. So much would accumulate that on the bush being jarred, or shaken, the rust would float off in the air, so as to be seen at a distance of several yards. Fearing that this floating dust was the spores of the rust, and if left it would spread, we accordingly, as soon as a bush became affected, dug it up. At the end of the first season, this prompt treatment appeared to have exterminated it. In the spring and early part of the second summer, only here and there a diseased plant could be found. As in the first year, these were promptly removed; but by this time the roots of affected plants had extended in among those that were healthy, and the two had become so interwoven that when a diseased plant was cut or dug up, from its distant roots diseased plants would quickly appear. It also seemed to spread by the mature rust being blown and lodging on the tender leaves of the shoots; those just unfolding appearing to be the only part on which the rust vegetates.

Our blackberry field is now four years old, and, after the second year, diseased shoots have been constantly increasing, and in spite of all our

watchfulness some of them, hidden among healthy canes, would occasionally escape notice, mature, and disseminate the rust. Of the two acres before mentioned, not a single square rod of it can now be found which does not contain roots that send up diseased canes.

But a few days since we inspected a lot of blackberry vines in the grounds of B. L. Kingsbury, a neighbor of ours. His canes are growing along a fence. Early this spring the rust appeared on a plant or two, and in a few days spread about two rods, completely covering the under side of all the leaves. But for a thicket of wild growth intervening between these and other canes, it doubtless would have spread much farther.

Mr. K., fearing to cut and move the bushes lest the jarring should cause the dust to be disseminated to other parts of the ground, by our advice spread among them dry leaves, and burned the whole. Soon after a plant assumes the yellowish hue, its growth is a good deal checked. Under these conditions, each of the affected canes pushes from near the ground a great number of other and smaller canes, or shoots, and each of these being sooner checked than those that preceeded them, pushes a great number of shoots, and each new cane produced, as we have described, being incapable of perfecting leaves, the mother plant soon becomes exhausted, and in the following spring rarely produces new growth; or if new canes are produced, they generally show the rust on the first leaves, and are soon killed. Such canes as are affected late in the fall may produce bloom in the following year, but will rarely perfect fruit. We have likewise observed that the same rule will apply to plants which were healthy in the fall which lose their new canes by rust early in the spring, or such as are checked in their growth by it. Whoever is familiar with the yellows of the peach can not but notice the marked resemblance of the effects of the orange-rust on the blackberry and the yellows on the peach. Indeed, so closely are these two diseases allied that, with the exception of slight differences, one description would answer well for both.

The flesh of peaches grown on trees suffering from yellows shows a peculiar logwood-red stain. The subsequent crops of shoots from the canes of the blackberry show the same. The yellowed peach tree exhausts itself by the production of new branches from the axils of all its leaves, or from such buds as under normal conditions would have remained dormant until the following spring. The blackberry, by pushing buds ordinarily dormant near the roots. The fungi on the peach, though its cells are much smaller, closely resemble those found on the leaf of the blackberry. The cells of each, though alike in form and both yellow, differ, in that of the blackberry being higher colored. If we are to judge of the relative productiveness of the two kinds of fungi as it occurs on single leaves, then that found on the latter is a thousand times more productive than that of the peach.

Next to a remedy, it is of interest to know how diseases are disseminated. To determine this point, if possible, with respect to the orange-rust of the blackberry, a few days since, we selected healthy blackberry

shoots just appearing above ground; some of the young leaves of these we dusted thickly with mature dust or rust; on others we slightly abraded the upper surface of the leaves, and after moistening them, rubbed a rusted leaf over them. It has now been seven days since these shoots were so treated; to-day they all present the unmistakable signs common to plants that become affected without artificial aid.

TWIG BLIGHT OF THE APPLE.

A good deal of inquiry has been made with respect to the Twig-blight in apple trees. The following letter, by Mr. Daggy, and the reply, will indicate what has been done in this direction:

DR. E. S. HULL, Alton.—*Dear Sir:* Enclosed please find a twig of an apple-tree, showing the blight, found in a neighbor's orchard. All the trees are affected more or less. This twig may not be in condition to show the character of the disease, but your familiarity with it may suffice. It is in spots all over the trees, from the trunk to the tips of the branches—some branches entirely girdled with it; yet there are green, healthy looking leaves and fruit above it; some trees (Rambo) are damaged to the extent of perhaps a fifth twig all over the tree, making them the worst cases I ever saw.

The owner of this small orchard is an amateur fruit-grower, who cultivates highly and prunes judiciously, but feels rather discouraged with the appearance of this indication of the destruction of the tree, while the insects are taking the fruit.

Can you give us the cause, cure, or future prospects of this blight, or rather your opinion and experience with it? We look to the "FARMER" for your reply.

TUSCOLA, Ill., June 11, 1870. E. DAGGY.

P. S.—I cut over two inches, and four healthy looking leaves from the present year's growth on the top of this twig.

The branch of an apple tree, with the above, came to hand a day or two after date. The branch was a good deal dried. We cut from it, however, several small slices of bark, going deep enough to include a thin slice of wood; with these we inoculated several succulent pear shoots, by tying in the pieces of bark as in budding. This was done during the recent drought, when it was not only dry, but extremely warm. These conditions of course were not the most favorable to the spread of blight, since, in addition to heat and warmth, a humid condition of the atmosphere is also required.

Soon after inoculating the pear shoots we were for several weeks confined to the house by illness, and to-day (July 20th), after a lapse of thirty-four days, by reading the communication a second time, were reminded of the experiment on the pear shoots. On inspecting them, we found them all blighted.

The blight had gone above inoculated parts, varying from one half-inch to two inches, and descended from three to fourteen inches, further confirming the opinion we have before several times expressed, that the fungi causing pear and apple tree blight are identical. This disease in the twigs is not new to the apple trees, nor is it unusual to see trees which are susceptible to it, made more so by late growth, as we will attempt to show further on.

In free-growing trees this twig-blight, so called, is not confined to the

twigs, but in such trees, and indeed, in all under certain conditions, the diseased sap is carried downward into the larger branches and kills them, and sometimes the whole tree. This most often happens to those highly cultivated, growing in rich land. This disease will continue until late in the season on trees pruned heavily, either in the fall, winter, or spring. On the contrary, there are many causes which retard blight, such as non-cultivation, drought, seeding the ground under the trees to grass, over-cropping, root-pruning, etc. In short, anything inducing early maturity, or tending to arrest the rapid flow of sap, will prevent this disease from being disseminated through the tree. We do not, in stating these several checks, wish to be understood as recommending all as a means of protection, since some of them, if employed, would produce so much debility that the trees would be of but little value for fruit.

If you have been careful to observe the trees in your neighborhood, which were losing their small branches by this blight, you, doubtless, have seen that there was an abatement of the disease at the time the current year's shoots began to develop their crown, or terminal buds. It is also probable that you have noticed on some varieties—slow growers—that the disease extended only through a few days, killing but a few inches of the ends of the shoots. But when the malady descended to the larger limbs, it has generally been supposed that the trees were suffering from another form of blight, when in reality the cases were identical, varying only in extent. Persons who have not had to contend with blight under varying conditions can hardly understand this, and are apt to consider trees blighting only in the twigs, and those blighting down into the large branches, affected differently. In localities where there is no blight, it will make no difference, so far as inducing disease is concerned, how severely the trees are pruned or highly they are stimulated; but where blight is present, much pruning, or extra cultivation, or any treatment tending to prolong growth must be guarded against, or be combined with some means whereby growth may be checked in time to prevent sap, vitiated by blight, being circulated through the system of the tree.

To show the injurious effects which severe pruning may have on the health of trees where the twigs are diseased, we will cite one case out of many of an orchard in the neighborhood of where we write: Some six years since, a gentleman unaccustomed to the management of trees came into possession of a productive apple orchard, which was then about fifteen years old. The new proprietor, after examining the condition of his trees, decided that not less than three-fourths of the branches, large and small, ought to be lopped off. Accordingly, early in the spring, our new orchardist had his trees pruned to suit his own understanding of their wants. In the month of May following, the blight in the twigs appeared, but instead as in former years of being confined to the twigs and small branches, it made its way further down than ever before. Soon the trees were covered with water shoots. These continued to grow to the end of the season, affording an active circulation of the sap, whereby the poisonous impression of the blight-cells was carried down

to the large branches, the most of which were either killed or so wounded that but few of them have since escaped destruction by borers.

Had this orchard been thoroughly root-pruned at the time the top-pruning was done, then there would have been no excessive or prolonged top-growth, and the vitiated sap would have been confined to the small branches, where it would have dried up, instead of having been carried downwards into the older parts of the trees; or had the trees, after they were pruned, made excessive bloom, followed by a large set of fruit, then the draft upon the trees to sustain these would have lessened to a certain extent the vigor of the trees, and an earlier exemption from blight and less disastrous results would have followed.

ROOT-PRUNING TREES IN THE SUMMER.

When speaking of root-pruning trees, we have often affirmed that, theoretically, the summer was the best time to do the work, especially so, when the operation was resorted to to induce a fruitful condition; but practically, that some time between late fall and early spring would be best. This, of course, was said with respect to trees planted in clayey soils, which in the summer months become so compact and hard at a little depth, that the labor of opening a trench deep enough to reach the roots would be attended with too great cost, as well as fatigue to the operator. In the winter the sub-soil becomes saturated and soft, and so long as it remains in this condition, several times as many trees could be operated on in a given time, as in hard soils. These are the principal reasons why we have so often directed to shorten the roots of trees in winter.

But we are aware that there are parts of the country where the sub-soil is sandy, and where it would require but little, if any, more force to move it at one season than another. Of course in all such soils it doubtless would be practical to delay the pruning until within a week or two of the time it might be desirable to check growth. Especially would this be the case with trees which it might be desirable to fruit early. Until the present year, we have had but little practice in root-pruning in the summer, and on that account can not speak with as much certainty of its effects as we could of winter pruning. Here (at Alton), this year, as early as the 25th of May, pear twigs, the longest of them, had attained the length of about one foot. About this time one hundred young pear trees of ours, not before root-pruned, varying in height from seven to fourteen feet, commenced to blight badly. We had all these trees root-pruned between the 25th of May and the 2nd of June. After the pruning was completed, fully a week to ten days elapsed before terminal buds on the young branches were formed; during all this time the blight spread rapidly, killing some of the trees and greatly disfiguring others. Had these trees been operated on in the winter or the previous summer, all would have reached a necessary condition of growth in time to have entirely escaped the blight. We had other trees root-pruned in all the early part of May, at intervals, until the 20th of the month. Those first pruned wholly escaped injury, while some three or four trees pruned as

late as the 18th and 20th, blighted a good deal, losing half or more of their tops, and one of them died quite down to the ground. From what has been explained, here and previously, it will be seen that when trees are to be root-pruned to prevent injury from blight, it must be so performed that the trees can not extend their branches after the time blight is expected. Or when blight is likely to appear early, summer pruning must be done the previous season. Here perhaps it will be well to state, that when the pruning is delayed until the 20th of May, double the amount of roots would have to be cut, to force a tree to rest by the first of June, that would have been required if the operation had been done before the trees leaved out.

If, however, as before intimated, our object in pruning be to secure early fruitfulness of the trees only, then we can see no objection to delaying the operation until such time in the summer as trees have made a fair growth, or until about the time the alburnum is forming rapidly.

If, however, the trees are pruned at this late period, the soil under them must be kept carefully stirred, otherwise little or no root growth would be formed until the following year.

APPLE-TREE PLANT LOUSE—(*Aphis mali*).

During the past summer several packages of diseased apple leaves were received, to each of which a reply similar to the following was made. The leaves were in precisely the condition that the leaves of many varieties were in this region last year. Each diseased part has a center, or several of them, caused by punctures of apple tree lice. On the most of these leaves the punctures were made while they were unfolding, before the under side was accessible to the lice, probably before the trees were in bloom or very soon after.

The eggs of the louse, which is the cause of this mischief, as well as the louse itself, are preyed upon by quite a small bird, early in the spring; at the same time, and later, by the lady bugs and their larvæ. Also by the larvæ of lace-wing flies, and other cannibal insects. Last year, throughout a considerable part of Illinois, the apple-tree louse infested trees in such vast numbers as almost to conceal the young branches, yet within five or ten days after the larvæ of the lace-wing flies appeared among them, scarcely a louse could be found. At the time of the disappearance of the lice, and for several days afterwards, their punctures were not perceptible to the unaided eye. With the help of a good lens, however, the wounds made by them were plain to be seen. It was also apparent that as soon as a louse was removed, the puncture it made in sucking the juices of the leaves, became a nidus or point to which that species of fungi which clouds the fruit, became attached.

As seen, when highly magnified, the spores of this fungus were heaped up many deep, and spread rapidly around the wounded part, until the the diameter of the patch would be an eighth of an inch or more. Another noticeable feature of the spread of this rust the past year, was that when it became largely multiplied around wounds, it spread to healthy leaves, tender branch growth, and to the fruit.

Leaves or fruit injured as we have just stated never show the arrested central point of attachment unless they have been previously punctured.

The leaves you sent represent both of the conditions we have mentioned. If you will carefully inspect the fruit on your Prior's Red, from which you took these leaves, you may on a few of the apples find a small circular patch of rust; with the finger rub this off and near the center you will discover one or more points which were the punctures of the lice.

It is worthy of note, that nearly all the fruit of russet or rough-skinned apples are but rarely punctured by lice, while they feed freely on the young twigs or leaves. If you find no wounds on your Prior's Red, then look on the Red June or Early Harvest, the fruit of either of which the lice prefer to the leaves.

From what has been said you will readily understand that it is too late to apply a remedy to your trees this year; but the coming spring you can keep your trees quite free from the apple-tree louse by simply slacking quicklime with boiling hot water, using just water enough to reduce the lime to a dry powder.

This powder should be thrown over the trees when they are wet, just before and after they are in bloom. One pint of the lime is sufficient to protect the largest tree. Or if you have a garden engine, a decoction of tobacco, water, and soap will answer equally well. Two men with a team can throw this decoction or the lime over five hundred trees per day.

THE ST. JOSEPH FRUIT REGION.

During the past summer and fall we spent some eight or ten days at Benton Harbor, across the river from St. Joseph, inspecting orchards, vineyards, etc. The shore of Lake Michigan, at St. Joseph, extends nearly due north and south. Although the east shore of the lake is far north of the line of successful peach-growing, excepting only such sites as occur along large water courses, yet this region is, nevertheless, well adapted for most fruits of temperate climates. The reason of this is found in the modifying effects of the open waters, so tempering the west and northwest wind in its passage over the lake that a difference of fifteen or more degrees is often observed at the same parallels between the two shores; also, when the wind is blowing directly up the lake from the north, there are points along the shore which are nearly, or, perhaps, quite as well protected from severe freezing, as though the wind were to blow across the water. The reason of this is that the winds in their passage up for a long distance are unobstructed, thereby acquiring great force, and whenever any great opening occurs in the high banks of the lake shore, as at the mouth of St. Joseph river, there the stiller air on the land is pressed back by the lake breeze. In this way the wind from the lake passes a considerable distance up the valleys and over the adjacent lands. At times so great is the lake current of air that after its passage into the valleys, it turns and blows a considerable distance in an opposite

direction to the wind on the lake. It is to this cause that sites opposite St. Jo. can be selected, against which north land breezes can work but little harm.

Doubtless there are many other places along the east shore of the lake equally protected as are the lands at St. Jo.

With respect to fruit insects, they are abundant, both at St. Jo. and Benton Harbor, and are increasing. Among those which we observed to be most troublesome on the fruit of the apple was codling moth; apple and plum curculios, trunk and limb borers were plenty, while the leaves, fruit and branches are sometimes infected with lice, and the fruit scabs. Peaches, plums, and cherries are much stung by the curculio. In some orchards it was claimed that in the past year no very marked increase was noticeable, while in others the ratio of increase in one year was estimated as high as one thousand per cent. Here, as in other States, the grape-vine insects abound, and some of them in great numbers. In some of the vineyards the grape-vine louse had spoiled all, or nearly all, the early vine and leaf growth. The *tettigonia vitis*, or leaf hopper, did not appear to be near so numerous as in localities much further south. They were sufficiently numerous, however, to show that they could be depended on whenever vine growing at that point shall become well established. *The Grape-vine Fidia*, the steel-blue beetle, and several other of the grape insects of Southern vineyards, were here found; also, that pest of the grape grower, the grape codling. This last insect, though much smaller, closely resembles the codling moth, and is, perhaps, more destructive, and more likely to rapidly increase in northern climates than either of the other grape insects which we have named. Our neighbors across the water are not strangers to tree diseases other than those induced by insects. There, as in Illinois and elsewhere, where fruits are largely grown, the pear tree is subject to the disease known as pear-tree blight, the leaves to leaf-blight, and the fruit to the russet patches and bands so prevalent in the southwestern states. Apple trees die from some affection of the roots. Cherry-tree leaves and young branches mildew. The leaves of the plum are attacked by fungi. Grapes rot, while the peach is not in all cases as vigorous as could be desired, nor is its fruit exempt from rot. Whoever goes to Michigan, or to any other fruit district, to engage in fruit growing ought first to understand that all the difficulties we have mentioned, and many more, will sooner or later have to be encountered.

TRAPPING CURCULIOS.

In company with Dr. Le Baron, State Entomologist of Illinois, we arrived at St. Joseph, Michigan, May 23d. We proceeded at once to the residence of Mr. W. B. Ransom, the discoverer of the new mode of destroying the curculio. We found Mr. Ransom in his peach orchard on his knees, under a tree, lifting his traps and exhibiting to several visitors present the curculios which were adhering to the under side of covers which he had laid around the trees. After receiving a cordial greeting from Mr. R. and others present, we, in company with Mr. R., carefully

prospected trees in that part of the orchard which had not been gone over that morning. The traps for capturing the "little Turk" were pieces of bark, say three or four inches long and about half as wide. These were laid close around the trunks of the trees, three or four of them to each tree. Before putting these down the ground was smoothed, and the earth pressed close to the trunks, so as to leave no hiding places for the curculios to enter. Four or five such bits of bark as we have mentioned are made to encircle the trunk of a tree. Mr. Ransom thinks it of much importance, on placing these bits of bark around the tree, that they should be down in contact with the earth, so that only very small openings under them be left. Pieces laid close to the ground, with one edge touching the tree, were generally selected by the insect to those that were loosely laid, and that were at some distance from the tree. The object of the insects in going under these seemed to be to shelter themselves, while at rest, from observation, and possibly from cold. So long as they remained under the covers, it was only necessary to pick up the bark and kill such insects as were under them, replace the traps, and in a like manner go from tree to tree. In this way it was supposed a man and an active boy could daily visit a thousand trees.

As soon as it was known that Mr. Ransom had clearly determined that curculios could be taken in large numbers by merely providing shelter for them, the St. Joseph *Herald* issued an extra, which was sent to all the fruit growers in the vicinity, setting forth the efficiency of this method, and urging immediate action and co-operation, on the grounds that the whole brood could be gathered and destroyed before they were ready to sting a plum or a peach.

The fruit growers, being thus timely notified and encouraged by the fact that all who laid traps caught insects, generally engaged in this novel mode of warfare; some averaging, for a time, as high as ten or a dozen per tree for the whole orchard. On the 22d, however, the weather had become warmer, and curculios were taken under the traps in diminished numbers; while in fact their numbers were rapidly augmented in the trees. About this time several persons tried jarring their trees. On the morning of May 19, Dr. Winans jarred from one plum tree 180 curculios; 20th, 94; 22d, 310, and on the morning of the 23d, 25 were taken by jarring, and two under the traps.

Several other persons had likewise resorted to both trapping and jarring; in every instance reported to us, many times more insects were captured by jarring than were taken under the traps; and at the time we left it was generally conceded that from that time to the end of the season the sheets were the only reliable means by which the peach crop could be secured free from worms.

On the last day of our visit (May 23), peaches at St. Joseph were about the size of a small hazel-nut, and probably the first cuts made by the curculios were on the 22d, possibly not till the 23d; and yet in both Mr. Ransom's and Mr. Whittlesey's grounds many peaches were stung. Dozens were picked off Mr. W.'s trees containing eggs of the curculio,

and yet Mr. W.'s trees had traps under them, and had been carefully tended from near the time of Mr. R.'s discovery.

A query here presents itself and one too of much practical importance. For example: Supposing no bugging by traps or otherwise had been done, up to the very morning of the day when curculios commenced stinging the fruit, and that on that morning a curculio catcher or other contrivance for thoroughly jarring the trees had been used, would not all the curculios have been taken which had previously come into the orchard and been trapped, together with those which did not enter the traps? This query seems to us all the more important from the fact that at the time curculios began to sting, the peaches on those trees which had been most thoroughly bugged seemed to have curculios enough on them to destroy all the fruit in a few days. If all the curculios on entering the orchard would go down under the cover provided for them, then the new mode of catching them would be best, since the labor could be performed by women and children. But any method of catching which fails to take all the insects, would not lighten the labor of jarring the trees. We have long since determined that it makes no difference how many curculios come together in the orchard for mating, or how long they are in doing so, provided the orchard is run in time to jar the trees twice before any of the fruit is stung. For aught that we can now see, jarring trees may safely be delayed as long when trapping is not resorted to as where it is; and for this reason, we can not understand how results of much practical importance can be realized by laying traps for curculios.

From present appearances, it seems that as soon as the weather becomes very warm, or by the time peaches are as large as a small hazelnut, curculios mainly go into the trees and do not descend to the traps. From this time there are not less than thirty days of active work to be done with a curculio catcher, and that, too, in the very height of the curculio season, during which time fully nine-tenths of all the insects which enter the orchards are to be taken. At Alton, sweet cherries and plums have to be run from about May 1st to June 20th. Peach trees, from, say May 15th to the latest date named. Judging from the difference in climate between Alton and St. Joseph, their curculio season would commence about fifteen days later than at Alton; and by reason of their cooler climate, their curculios would continue active until August 1st, after which, at both points, stragglers would appear near to the end of the season.

At Alton, curculios, from neighboring orchards and from the forests, begin to migrate freely about the first of June, and from that time on for the next twenty to thirty days they are most difficult to control, because they fly freely the after part of the day; and during this later period, when they enter the orchard they are ready to lay their eggs; therefore, they must be caught as soon after they enter as possible.

On Mr. Ransom's first making known his discovery, it was, we believe, generally regarded as being a sure and easy way of ridding the orchard, or as the editor of the St. Joseph *Herald* stated: "There is no doubt whatever that the long-desired means of exterminating the curculio is

discovered." On the first day of our visit to the St. Joseph and Benton Harbor orchards we were strongly inclined to believe that a remedy, at least nearly perfect, had at length been discovered, and had we returned without making a second day's investigation, we might have been at a loss to know whether it would do or not to trust to trapping to save a crop of fruit.

On first seeing the insects under the traps we were at a loss to determine whether they were apple or plum curculios. To determine this we brought home specimens, and after carefully comparing them with those known to make the crescent cut, we find nearly all were plum curculios. When we left, Mr. Ransom or others did not seem to be quite as hopeful as they were at first. The last day we were at St. Jo. Mr. Ransom told us that since the weather became warmer but few curculios would come down from the trees, and that himself and assistant were hand-picking the trees.

This sudden failure of the curculios to go under the shelter provided for them, caused quite an animated discussion, and as several practical gentlemen participated in it, some valuable experience was elicited.

Many instances were mentioned of gronnd which had been recently stirred or dug up, on which bits of bark or boards had been laid, of curculios at once adhering to the under side of them as though they had just come out of the new stirred ground. Others were found with mud or clay adhering to their backs, looking as though they had just come np from a considerable depth. A popular theory with some was, that the curculios crawled at night from their winter haunts to the orchards, and after feeding on the foliage by night, had crawled down the trees and under the nearest cover, where they remained during the day, but each night returned to regale themselves on the foliage of the trees after which they again sought shelter to take their daily nap. This theory has not been sustained, no one ever having seen a curculio descend from the fruit trees, either to shelter itself, or for any other purpose.

Since so much interest and importance has attached to the discovery made by Mr. Ransom, several persons have had the cheek to claim that they have known for many years that curculios would avail themselves of shelter when it was provided for them. Without advising our readers to rely on this discovery to save their fruit crops from the "little Turk," we would nevertheless advise all to experiment in this new field so recently opened to them.

When we arrived at home from our Michigan trip, curculios had been at work in our grounds about twenty-five days. We were, on that account, at least that number of days too late to fairly test the value of Mr. Ransom's discovery for this latitude. But that we might know with respect to its merit in our warmer climate, as a means of exterminating or capturing such curculios as yet remained in the orchard, or those which came in from the forest or surrounding orchards, we at once selected five of our largest Nectarine trees in fruit.

The trees we selected were those most exposed to insects coming in from other points. The neccessary preparation of ground was made, by

removing all rubbish under which the insects could secrete themselves, and by perfectly leveling and smoothing the earth under the trees, and especially around the stem of the trees so as to leave no lumps of earth, or cracks, or crevices under or in which a curculio could secrete itself. This done, we surrounded the stem or trunk of each tree with corn cobs, pieces of bark, etc., placing these so the edges next to the trees should touch the trunks, and pressed them down gently into the earth so as to leave only small openings under them into which the insects could enter.

Now for results:

May	29.	Curculios taken under trap	0
"	"	On curculio catcher	63
May	31.	Taken under traps	0
"	"	On curculio catcher	38
May	31.	Cloudy and rainy a little.	
"	"	Under traps, Plum curculio	2
"	"	Under traps, Apple curculio	3
"	"	On curculio catcher	41
June	1.	Taken under traps, Apple curculios	3
"	"	Plum curculios, on curculio catcher	58
"	"	On two corn cobs, laid together in forks of tree	1
June	2.	Taken under traps, Plum curculio	1
"	"	Apple	4
"	"	On curculio catcher	109

The catcher was run about seven o'clock each morning, and the traps were examined at five, at noon, and again between six and seven each evening.

We trust that our Michigan friends, Messrs. Ransom, Whittlesey, Jackson, and Dr. Winans, and others who are trapping their insects, also jarring them down, will continue both modes, at least on a limited number of trees, to the end of the curculio season, carefully note the results, and forward the same to us for publication.

Connected with this new discovery, it seems to us that it would be well to mark, as near as may be, the earliest and latest periods at which the larvæ of the curculio leave the fruit, as well as the earliest and latest periods at which curculios, bred this year, emerge from the ground as beetles; also, how large a proportion, if any, hibernate below ground during winter, in the larvæ form. This would aid in the coming year in ascertaining what proportion of other curculios, than those which come out of the ground in the spring, are captured by traps.

Last fall we were at Benton Harbor, Mich., as late as October 20th. On some peaches of the Key Port white variety brought home by us, a few, half to two-thirds grown larvæ were found. These, and probably all the larvæ that left the fruit after the middle of August, would retain the larval form until the following spring.

On our late visit, May 22d, nearly all the curculios furnished us by Mr. Ransom, taken under his traps, had the bright and lighter colors

peculiar to those just emerging from the ground. So uniform were they in this respect as to lead us to suspect that they could not be plum curculios, while curculios caught in Mr. Whittlesey's grounds, in the act of puncturing fruit, were darker colored, looking like those taken farther south.

Attention to the suggestions we have made would aid in clearing up several mooted points concerning the habits of the curculio, as well as furnish accurate data on which to base future operations.

All our orchard ground has been thoroughly stirred, and cobs or other traps will be placed around all the trees early in April. And we advise all to devote time to this means of trapping. Do it early and thoroughly, and report results. But at the same time be sure to have a curculio catcher ready in case of need.

We will cite only a single case, though numerous others could be adduced, showing how rapidly curculios increase and advance upon new territory:

We recently inquired of Mr. B. Pullen, one of the most extensive and successful peach growers of Centralia, Ill., with respect to the season's catch of curculios at that point. He informed us that most of the orchardists united for the purpose of capturing these insects, some running as many as three catchers. His own orchard the previous year was barren of fruit, or nearly so; but notwithstanding this, from his own trees upwards of 70,000 curculios had been numbered as the product of this season's run.

GRAPE CODLING.

Among the insects injurious to the vine, which have within the past few years become numerous in most, probably all, of the large vine districts of the West, none have spread so rapidly, or appear to be so little known, as the Grape Codling.

During the past few years we have repeatedly visited vineyards in which twenty, and in some as high as fifty per cent. of the grapes were spoiled or had rotted from injuries clearly traceable to the work of these insects; and that too, without its presence being suspected, the proprietors generally supposing that the damage was to be attributed to rot. At the meeting of the Mississippi Valley Grape Growers' Association, held at St. Louis the past spring, it was stated by prominent vineyardists that the ratio of increase of these Grape Codlings was 25 per cent. per annum; and that up to that time no parasitic insect or other natural check was known to have appeared to materially interrupt their regular increase. A number of years since we read a paper before the Missouri State Horticultural Society, in which we referred to the codling moth having become domesticated in the older vineyards around Alton, apparently being as much at home in grapes as in apples.

At that time, and until the editors of the *American Entomologist* decided differently, we had no doubt that the larvæ found in grapes and those in apples were one and the same insect.

It is true that the worms in the grapes were known to be one-half smaller than those which matured in the apples, yet, in every other particular, we could see no very marked difference.

We have been acquainted with the larvæ of the Grape Codling since near the time we settled in the West; this insect, therefore, can not be considered a new enemy of the vine. Previous to the great increase of vineyards it, like many other insects, does not appear to have attracted the special notice of entomologists.

We do not speak disparagingly when we state that prior to the summer of 1868 we believe that the then State Entomologist of Illinois or of Missouri practically knew nothing of it.

About the 16th of June of that year, Mr. Walsh, the party first referred to, paid us a week's visit, and we directed his attention to what we, up to that time, had believed to be apple worms in our grapes. He at once made a careful comparison of these larvæ, under the microscope, with those of the codling moth taken from apples, and stated that he believed them to be different, but that they would probably be found to belong to some some closely allied moth.

A few days after Mr. Walsh left us, we were with the *Ad Interim* Committee of the Missouri State Horticultural Society, visiting the Iron Mountain district. We there directed the attention of the Missouri State Entomologist to the same insect, and after a tedious search in the vineyard of Dr. Dyer, near Vineland, we succeeded in finding two or three of the larvæ.

Some time after this he stated he had bred to the perfect state, and found them to be distinct from the colding moth. Figures of this Grape Colding were published on page 77 of the American Entomologist for May, 1869. The manner in which the larva cuts and folds the cocoon out of the leaves of the grapes is shown on the page following. While we do not doubt that these delineations of the three stages of the insect are correct, nevertheless, we think the writer has fallen into an error with respect to the manner they prepare for their transformation, especially in the open ground. Never having experimented with the larvæ in confinement, of course we do not know what use they would make of pocket handkerchiefs or leaves, if provided with those articles. We now quote from the article above referred to, last half of paragraph headed, "Its Natural History:"

"The cocoon is often formed on the leaves of the vine, in a manner essentially characteristic. After covering a given spot with silk, the worm cuts out a clean oval flap, leaving it hinged on one side, and, rolling this flap over, fastens it to the leaf, and thus forms for itself a cosy little house. One of these cocoons is represented at Figure 124 b, and though the cut is sometimes less regular than shown in the figure, it is undoubtedly the normal habit of the insect to make just such a cocoon as represented.

"Sometimes, however, it cuts two crescent-shaped slits, and, rolling up the two pieces, fastens them in the middle as shown at Figure 125. And frequently it rolls over a piece of the edge of the leaf, in the manner commonly adopted by leaf rolling larvæ, while we have had them spin up in a silk handkerchief, where they made no cut at all."

On reading this and looking at the drawings representing hinged flaps in the leaves, we could not divest our mind of the fact, that we had often, as we thought, found the larvæ of these Grape Codlings under cover of loose bark, and in the crevices of grape supports.

The past fall fully sixty per cent. of our Catawba grapes were hollowed out by these pernicious insects; or to state the case differently, had a careful computation of these larvæ at the time been made, and the same of the leaves on the vines, we believe the former would have outnumbered the latter; and yet, the most careful inspection made by us and others, extending on till the late frost, failed to detect a single grape worm, folded in a leaf, preparatory for summer transformation or for hibernation. On the 23d of July of the present year, we visited Kirkwood, Mo. While there we were shown a vine, in Dr. Spalding's grounds, which was growing in an open field at considerable distance from other vines. Aided by the doctor, we inspected each leaf of this vine, and though some thirty of the grapes on it had contained grape codling larvæ, which had evidently reached their full size and crawled out to seek a cover under which to transform, notwithstanding, not a leaf on this vine had been rolled near the edge, nor had any flaps cut in them. Again, late in November last, we looked over the stakes in our vineyards, and finding numerous cocoons of Grape Coldings in them, we had them carried to the wood pile and new stakes set. Either from burning these old stakes, or from some other cause, this season, for the first time in seven years, the Grape Codlings are so scarce in our vineyard, that probably as an average not more than one wounded grape in five bunches could be found.

Does the general reader ask what particular advantage is to come from knowing the habits of our insect enemies? We answer, that such knowledge is the basis of all successful remedies. For instance, plum curculios are known to be timid, and to drop to the ground on the approach of danger; this has been taken advantage of by receiving them on sheets spread under the trees from which they are jarred.

Quite recently it has been discovered, with respect to this same insect, that in the early spring many of them seek shelter. Advantage has been taken of this by providing shelter for them, by which means vast numbers of them are caught.

As far back as 1832, Mr. Joseph Burrel, of Massachusetts, practiced laying rags in the forks of his apple trees. This was done because he knew that when other cover was removed from the orchard the larvæ of the codling moth, so destructive to apples, would accept those in which to spin their cocoons, and while there would be easily killed. So it is of almost every mode of attacking our injurious insects.

We first determine their habits, and having learned these we discover some period when they may be successfully attacked. Hence, was it true that grape codlings hibernated folded up in the leaves; the remedy that would very naturally present itself would be, to collect all the leaves in the fall, and burn them; or judging from the nature of the larvæ, what would be equally well, plow the leaves under to rot.

But if these insects, especially the last brood, have not the habit, at some period of their larval existence, of attaching themselves to the leaves, then it needs no argument to show how useless an operation it would be to gather and burn the leaves of a whole vineyard, as has been recommended in the *Entomologist*, expecting thereby to destroy insects which had taken refuge somewhere else. On the other hand, observation has taught us that these Grape Codling larvæ have the same habit, on leaving the fruit, as their near relatives, the apple worms. Where, then, should we search for them except under such cover as would afford them needed protection against storms and observation? Such places in a vineyard would be in crevices and holes in trellis posts, or, if stakes are employed, under the bark or in openings, as the stakes might afford. It is in such places, we will here state, that we have always found them rolled up in a little cocoon—smaller, but not otherwise unlike that of the apple worm.

The principal facts in the history of these grape codlings may be summed up briefly as follows: That the winged-moth appears early in May, and during the first warm days lays her eggs, only one in a grape, in a crescent, which she previously makes; that these eggs are hatched in from three to ten days' time, varying with the temperature; each egg producing a worm, which at first is too small to be detected by the unaided eye; that in from four to six weeks they attain to their full larva size, and soon after leave through the opening by which they entered, and lower themselves by a web which they spin from their mouths, and afterwards crawl to some secure retreat, where they form a cocoon, in which they transform.

In conclusion, these insects are several brooded, and appear to be on the increase, infesting most districts occupied largely by the vine. Judging from the similarity of habits of the grape and apple codling, it may prove that our defense against their depredations will also be similar.

From this time (August) until cold weather occurs in the fall, vineyardists will do well to watch the doings of these grape codlings that they may devise more effectual means for their destruction than any which have heretofore been practiced.

The above was published in the *Prarie Farmer* early the past fall, since which time we have experimented by tying bundles of leaves to grape supports, also binding rags around them. Others have done the same, with results as was expected, viz: The larvæ entered and spun their cocoons. Remedy—late in the fall, gather the bundles of leaves or rags and burn them.

ON THE CULTIVATION OF THE APPLE IN NORTHERN ILLINOIS.

BY DR. L. S. PENNINGTON, WHITESIDE CO.

To improve and make successful the cultivation of the apple, in this new country, and especially in this portion of the Northwest, has engaged, and still continues to claim, the attention of our most intelligent and

thinking mind. Pioneers in a great enterprise (Horticulture), new and untried, is it not strange that their failures have been so few, and their successes so great?

It is with pleasure and with pride, that I read from year to year, of the efforts made by the horticultural societies of Illinois, as well as by many of the kindred associations of the West, in this field of labor, continued as they have been through so many successive years, and some, with great failure and loss; yet the work ceases not, and the workmen turn not back. Such perseverance can but result in improvements, lasting as they are beneficial. We are in many respects a fast people; our habits but little induce to that patient toil and careful observation necessary to secure such results. Yet much useful knowledge has been gained since the settlement of our country.

It is the experience of those that have lived here since 1840, and cultivated the apple since that time, that they have lost a large number of the varieties planted, from climatic changes, or they have proved worthless from their unproductiveness, or from the inferior character of the fruit; and I regret to say that some sorts, which for years appeared to be a success, have in the end failed. This has not only been the case with the old varieties, but with a large number of the new (seedlings).

These lessons should make us slow to introduce either old or new varieties, except they first shall have passed unharmed through a cycle of our years, which, as many claim embraces, as a rule, about fourteen (14) years. We know that three such cycles or great climatic changes have taken place since 1829; but it is to be hoped that hereafter these changes may be greatly modified by the continued planting of trees, and the general improvements that are constantly going on in the West. We shall be mistaken, if this is not so.

My own efforts have been to produce new varieties, adapted to our soil and climate; and after experimenting with a large number for more than twety (20) years, have, I regret to say, produced none equal to some of our old standard varieties. For home purposes, and for the amateur, a larger list can be indulged in; but for shipping purposes, the list is as yet but a very meager one. The many thousands of trees that are now everywhere found as mere cumberers of the ground, are so many standing witnesses of our inexperience. But that shield can not longer protect those that raise for the market, nor those that plant orchards expecting to make them remunerative.

Our horticultural and agricultural societies should offer a high premium for a commercial apple of high merit—the tree as well as the fruit, making up the conditions.

Among the number that have best succeeded in this locality, I would name the Red Astracan, Yellow June (or Kirkbridge White?) Early White (tender), Soulard, Early Nonsuch (or Early Nonpareil), Haas or Horse, Fameuse or Snow, Rambo (tender), Early Pennock (tender), Domine Gilpin, and Willow Twig.

As a shipping or commercial variety, I have raised none that can compare with the Willow Twig, and the experience of years but confirms

its value. There are other reliable varieties raised in Northern Illinois, but not having so long an experience with them, I leave their commendation to others.

The number, I feel well assured will, step by step, be increased, but not so soon as our earlier years had anticipated. As to the diseases incident to the tree and to the fruit, no enemy at the present time can be compared to the codling moth, and yet we hope that this will soon find its destroyer. None of the remedies, or moth catchers yet proposed, can be made to pay on a large scale; at least that is my understanding and experience.

The only apparent exemption from this destroyer which I have noticed was where the orchard was used as a cattle pasture. I would inquire if others have, to any extent, noticed a like exemption? I would here suggest that if no feasible remedy shall soon appear or be discovered, whether it could not be reached by some statutory provision by which the fruit shall be either consumed or destroyed as fast as it falls? More than half the labor and capital invested in the orchard is now lost, or in a measure destroyed, by this moth. Is it not worth some sacrifice and labor to provide for its destruction?

The rotten root spoken of by some is, with me, an enemy of the past. It was always found on a wet and compact soil, but since drainage was resorted to, and the soil has become dry and friable, it has entirely disappeared. I am led to believe that the diversity of opinion that exists to so great an extent among our fruit growers as to the hardiness, bearing qualities, and diseases of our orchards, depends largely on the drainage, both natural and artificial, of the orchard site.

The geological relations of a soil may exert an influence in modifying the character of a fruit, but if so they have escaped my observation. I have, for evidence of this, with some care watched the orchards planted—some on a soil resting on the Galena limestone of the lower Silurian, some on the magnesian rocks of the upper Silurian, and others on the Devonian. Questions like this require much time and careful observation, in order that they may be more widely and better understood.

REPORT FROM THE SECOND HORTICULTURAL DISTRICT.

O. B. Galusha, *Secretary of the Illinois State Horticultural Society:*

Dear Sir:—The closing year has been one of peculiar interest to the horticulturist.

Spring opened about the first of April, and, with little exception, the weather was quite warm and dry; no general rain until September. The first hard frost occurred November 9th; plowing was stopped by frost December 15th.

The season throughout has resembled those of extreme Southern Illinois more than it has the average ones of our own latitude. As a consequence of the excessive drouth, the losses in transplanting have been very great.

Strawberries were finely flavored, but in most localities they were small, and their season of short duration. Those who formerly grew them for the Chicago market became discouraged by the low prices a few years since, and abandoned their culture to such an extent that the county towns take the crop grown in their respective vicinities at fair prices.

The crops of *Raspberries*, *Currants*, and *Blackberries* were also cut short by the drouth, which will induce many in the future to adopt the practice of mulching.

Gooseberries, in my immediate vicinity, were in some gardens a full crop, and in others an entire failure.

Cherries—Common and English Morello were abundant. Early Richmond generally matured not more than one-fourth of a crop. E. A. Richmond, of Genesco, says: "Not one perfect specimen."

Peaches are not generally grown. Quoting from I. W. Stewart, of Florid, Putnam County: "not so much as they should be (in the southern part of this district). I have had peaches for the last three seasons, and a fair crop each year; this season more than we wanted to use—seedlings, of course—but many of them of very good quality."

Apples.—Apples were generally an abundant crop, free from scab, in marked contrast with the crop of 1869. The codling moth still continues to be a great evil. Pasturing with any kind of stock to eat the fallen fruit tends to keep them in check in some degree; but it is hoped that many will be induced to try bands of hay or rags placed around the bodies or in the forks of the trees, examining them, and killing the worms as often as once in ten days. In my own orchard, there seems to be a difference in varieties, as to their liability to be attacked by the moth. Westfield Seek-no-further appears to be troubled less than any other variety.

The *borer* is very troublesome where introduced. Washing with hot soap has not with me proved good protection. Careful inspection twice a year is the only effectual remedy that I have tried, though it would seem that encasing trees with bark, as practiced by Mr. J. W. Cochran, of Blue Island, or with tarred paper, applied in May, must be effectual. In consequence of the length of our warm season, many perfect beetles anticipated their proper time for exit, and came out late this fall, it is hoped, to be killed by the frost before depositing their eggs; or if deposited, that the frost may destroy them.

Pears gave but a light crop; in some localities, as in Putnam County, Mr. Stewart reports "free from blight;" but they never blighted worse with me. One standard tree of White Doyenne, which appeared dying from blight in the spring of 1869, was then thoroughly root-pruned, and is recovering. One tree, twenty-five years old, on thorn root, bore a good crop of fine fruit.

Plums were generally destroyed by curculio. Mr. S. D. Scofield, of Freeport, reports "the Miner is the only plum tree that has seemed to repay for planting; has done well in moist land, and I am told by close observers, that in such localities it seldom, if ever, fails of producing

good crops. I know of high and dry localities in our own city where the crop the past season has been immense, but such are exceptions. We would not exchange it for all the other plums ever planted in the county, as one year's crop would pay more than we could ever hope to realize from all others." A basket of this fruit, sent me by my friend D. W. Scott, of Galena, came fully up to the recommendations of its friends.

Grapes.—Grapes are represented as a perfect success in all parts of the district. Mr. Alex. Strachn gives an account of a great exhibition held by the Rockford Horticultural Society. He says, "*Roger's Hybrids* were well represented, and gained many admirers. They will receive more attention. *Delaware* is rather losing ground; being hard to manage. *Concord* still holds its own, as does the *Hartford Prolific*, although the fruit of both cracked badly in some localities. *Iona* is working its way up. *Eumelan* is promising. On the whole, our grape crop is all that could be asked for. The market was well supplied, and the growers complained of the price."

Mr. Strachn strongly urges the forming of Horticultural Societies in each county, auxiliary to the State Society. The work accomplished by the societies at Rockford and Galena are powerful arguments in favor of their multiplication.

The work which the Northwestern German-English Normal School at Galena, is doing, under the management of Prof. J. Wernli, is second, in our State, only to that of the Industrial University in advancing the interests of Horticulture and a love of rural life. In a letter just received from Prof. Wernli, in alluding to their local Horticultural Society, he says:

"The old members of this Society are men of great experience, and of real philanthropic views and actions. Mr. Robson worked last winter with great zeal to enlighten the youth and the aged on the advantages of horticulture, and other members assisted him. I am richly rewarded by attending the meetings of the Society; adding to my knowledge on this subject every time. * * * * Our young men prefer the store and the city and leave their fathers' homesteads. Why? Many answer, 'their parents do not make home attractive to them.' I venture to say their teachers and school-books make city life more attractive to them than do their parents the farm.

Do not, in most cases, our reading books give examples of success in life, illustrating the smart farmer becoming a merchant or a lawyer? Are not the teachers, especially those educated in colleges and normal schools, strangers to farm life? and does not their city-like deportment betray them? I believe that our Normal Schools should educate the teachers more in accordance with the wants of the country. They should study horticulture, natural history, botany, and agriculture more; and if they could be inspired with love for the garden and the orchard, this love would be transmitted to their pupils, and we might soon see the effect in scientific farming, and in beautiful orchards.

Agricultural Colleges will certainly be beneficial; but their useful-

ness can never stand a comparison with the benefits that might be derived from a Normal School where these branches are taught. We have here a larger attendance of students than ever. The six weeks before Christmas we spent in some lessons on arboriculture, and I hardly know who was most interested, the teacher or the large class of young men. I felt myself tempted to teach more practical lessons, by starting a fine forest somewhere in Iowa.*

Now we commence the raising of fruit trees. I like this branch, on account of the interest taken in it by the students, and its great usefulness; but what is this small beginning, compared to our great want?"

May such schools, and such teachers, increase and multiply. Let our young men learn that the Creator makes no mistakes. When he placed man in the country, it was for his best good and highest happiness, here and hereafter.

Yours truly,

SAMUEL EDWARDS.

A VOICE FROM TAZEWELL COUNTY.

The history of the fruits and plants cultivated, of the trees artificially planted, trained, and enjoyed in the different counties of our State, would form a very interesting item of our yearly Transactions; it would also form a volume of very large dimensions, and entirely too voluminous for practical purposes. If every pioneer of the divine art of Horticulture were mentioned as he should be, it would occupy too much space; and if all the congregation of worshipers at the shrine of Pomona were catalogued, we could hardly find time to speak to them, or shake hands with the immense crowd. This is a sort of natural religion. One that children have never got to be converted to. It is taken the natural way. In this religion of agriculture there is no total hereditary depravity. Every child born into this natural world is a lover of flowers; a lover of fruits; an admirer of trees and natural out-of-door's scenery. Hence it is urged that there is no hereditary total depravity in the religion we preach in this hall, on this ground, and among these brethren. But as childhood vanishes into maturer years, our miserable systems of education come along and bring in a sort of depravity, and in some it becomes total depravity, from which we have to convert men and women, but not children. Having now stated the two prime articles of our creed, viz.: Every body has this religion naturally, and by a sort of unnatural education almost every man and woman become depraved, and some totally depraved—it is proposed to say something of the progress of this reformation in Tazewell county, Illinois. This county is bounded on the upper side by the zenith, and on the nether side by the nadir. So if it is not very broad it is both high and deep. It has a soil well adapted to trees, plants, fruits, and flowers. Many of the citizens are availing themselves of these natural advantages.

*QUERY BY THE EDITOR.—Why not upon the large prairies of *our own* State?

Apples, pears, peaches, quinces, cherries, grapes, gooseberries, currants, strawberries, blackberries, and raspberries, together with esculent vegetables of all kinds suited to our climate, are cultivated in great abundance. We have the usual insect enemies to contend with, and the usual helps from birds and cannibal insects, which said birds never fail to call in autumn for their pay, and sometimes with the audacity of man, almost, levy heavy contributions, which we are not willing to yield, but which are generally admitted to be just.

Birds may live very well without the biped called *man*, but man would soon be driven from his planetary home without birds.

Very great injustice will be done by this report, unless special mention is made of the increased interest manifested by the ladies in plants and flowers, and especially house plants. One would like to mention the names of some of these converts to the true religion of horticulture, and of their favorite plants; but space will not permit, and discrimination would be unjust, and therefore we must let them pass. Upon the whole, "Old Tazewell" is progressing rapidly in fruits and flowers; in orchards and vineyards; in ornamental trees and shrubs; in the more constant use of fruits, as an every-day diet, and as a matter of course, in the health and intelligence of her people. Finally, to the parent Society, "The Horticultural Society of the State of Illinois," she sends a friendly greeting, a hearty "*God bless you*," and a most earnest desire for your prosperity.

Very respectfully submitted,

GEO. W. MINIER.

OSAGE ORANGE HEDGES.

BY JOHN TUNNELL, PLAINVIEW, ILL.

I hope, at this late day, it will not be necessary to offer any arguments in favor of Hedge Fences. It has not been many years since hedging with the Osage Orange was an untried experiment, and, when first introduced into this country, it was taken hold of by farmers with a great deal of caution. Some claimed that the hedge would "sprout up" from the roots, and encroach upon the adjoining fields, and finally become a plague that could not be easily subdued. Others argued, that the cost of the cultivation and of pruning and disposing of the brush would be too great to admit of its coming into general use, while still another large class chose to use such fences as their fathers had used before them, without troubling themselves for a better or a cheaper one. These objections do not now exist. The country is full of evidence of the beauty and usefulness of the Osage Orange hedge, and the only question necessary to discuss is, "How can we grow the best hedge, in the shortest time, and at the smallest cost?" In giving my views on this matter, I hope I may be indulged in giving the *details* of my practice and observation in hedging, as it is often by the observance of these *small* considerations that we attain the greatest success.

The preparation of the seed should commence about a week before you wish to plant in the nusery, and may be accomplished in the following manner:

First, soak the seeds five or six hours in water as warm as you could hold your hand in comfortably, then place them in an open vessel which will allow all the water to pass off freely. Place them out in the sun in the day, and by the stove at night—if it should be cool. Keep the seeds constantly warm and moist, by occasionally pouring warm water over them. Spread something over them to prevent the top from becoming dry. Watch them closely, and when you see the mass beginning to "pip," they are ready to plant.

In selecting your ground for a nursery, the following considerations are most prominent: The ground should be warm and dry, and of that active, mellow character which will not be "run together" by the rains which may chance to fall before the plants are up. It should also be free from weeds, as the young plants are very tender and easily overrun by vegetation of a more rank growth. It should also be selected with a view to its freedom from moles, as they are very damaging to the plants—so much so that they must be destroyed if they make their appearance. The preparation of the ground should be most thorough. To accomplish this, plow deeply, that any over charge of water may quickly pass below the seed, and that the seeds of noxious weeds may be covered so deeply as not to vegetate readily. Harrow well, that the ground may be thoroughly pulverized, and roll, that all the vacuums in the surface may be filled up, thereby preventing the ravages of drying winds in case of drouth. When this is done, take your corn-marker and mark out the ground the width you would for corn. If you intend cultivating with a horse, this will be a convenient width. If you wish to cultivate by hand, you can go over the ground again, with the same instrument, and divide rows, which will afford ample room for hand cultivation. As soon as the ground is marked out, and while the furrows are yet fresh and moist, the seeds should be planted, which may be done by hand, drilling in from two dozen to three dozen seeds to the foot. The covering may be very well done with a common garden rake, drawing in the mellow soil and removing the clods and trash. Nothing is now to be done until the plants are nearly ready to come through the ground, at which time much can be accomplished by going over the rows again with a rake, by which means you break any crust which may have formed, and destroy any weeds which may be coming in advance of the plants. From this time, close attention will be necessary. The horse cultivator, by frequent use, will do most of the work, but the hoe and even the hand-pulling of the weeds may be necessary. The soil must be kept stirred and the weeds must be kept down.

TIME OF PLANTING.

The seeds should not be planted until all danger of frost is past. In fact the ground should be allowed to become quite warm, as our success often depends upon getting the plants up quickly.

PREPARATION OF THE HEDGE ROW.

The hedge row ought to have a preparatory plowing in the fall before planting. Plow your first furrow on the line of the contemplated hedge and bed up a width of eight or ten feet. This preparatory plowing insures the necessary drainage, and exposes the soil to the action of the winter's frost, making it much more friable the following season. In the spring as soon as your hedge row is in good order to work, take a good team and plow the hedge row very deeply, throwing the soil out and making the dead furrow where you want the hedge. Harrow thoroughly, and, if necessary, roll the ground. Then plow again, commencing in the dead furrow and bedding up as before, after which harrow again, if necessary. Much time in transplanting is saved by thorough preparation of the ground. This mode of preparation can hardly fail to give satisfaction. A very deep and mellow seed-bed is obtained, and the drainage is very much assisted by the deep plowing. It may be well to remark here, that in low places it will be necessary to bed up the row above the water, as the plants will not succeed where water is allowed to stand about them. To insure a straight line, set stakes along at intervals, as if to set a fence, then take a steady team and draw a furrow very deeply on the line of the stakes. If the plow has been kept to its place, and given a deep, clear furrow, you may think yourself ready for planting. The plants should be carefully examined, and all dead or doubtful ones thrown out. Failure in hedging, as well as tree planting, often results from an admixture of worthless plants. The tops should be cut off some three inches above the yellow part of the plant. Place the plants along the row, leaning them on the bar side of the furrow. Follow with a hoe or garden rake, which is better, and draw a light covering of the soil up against them, after which press the dirt on the plants by placing the foot on every one. This fills up the vacant places about the roots, and assists in retaining moisture, after which a plow may be used to fill up. The plants should be almost entirely covered up, as this protects the buds from the drying influence of the sun and winds. It will be observed that those plants which shoot from below the surface are generally the most vigorous in their growth. The distance between plants is a question which is not yet fully settled among growers. The most of the hedges now growing in this country were probably planted at a distance of from four to six inches asunder. It has been observed in these close-planted hedges that the plants will not all prosper and maintain their relative strength in the hedge. Some will make a very vigorous growth, while adjoining plants, being sapped by their stronger neighbors, will pine and die. This results in gaps, which have to be closed by plashing. Admitting these facts, I should plant with a view to plashing, at the start, and should plant far enough apart that every plant would be able to maintain itself. About one foot, I think, to be the proper distance to set the plants. When the buds begin to burst on the plants, cultivation may be very much forwarded by raking

the row with a common garden rake, drawing the rake across the row the way the plants are leaned. This destroys any weeds which may be coming in advance of the plants, removes any crust which may have formed, and leaves the hedge in nice order for after cultivation. The cultivation, the first year particularly, should be very thorough, as this is the only means of insuring the life of the plants and the success of the hedge.

After the foregoing considerations have been complied with, the ground very deeply and thoroughly pulverized, and sufficient drainage insured, if the ground is frequently stirred and kept free from weeds and grass, no drouth which we are likely to have, will prevent a good stand and a fine growth. There is probably no better mode of cultivation than to take a one-horse plow and throw the dirt away from the hedge, plowing quite close to the hedge, but taking proper care not to run under, or otherwise disturb the plants. Then follow with a hoe, removing all weeds and grass which the plow may have left. You may then turn with the plow, and throw the soil back again, as it would not be prudent to leave the hedge for a great while with the soil thrown from it. By this course you will secure the best results, and prevent that excessive "bedding up" of the hedge row which we sometimes see. After the first year very little hoeing will be required—the plowing, if nicely done, being generally sufficient. Let one thing always be borne in mind, that to insure the best hedge in the shortest time, it must be kept *well worked, and free from weeds.*

I should not advise any pruning until the plants arrive at a proper size for plashing, which, to insure the best results, should be as large at the ground as a common hay-fork handle. If plashed while too small, strong shoots will start up from the stump, and supplant and destroy the original trunk. The plashing should be done before the sap rises in the spring, otherwise the bark will slip in handling and the growth will be injured.

Trim the sides to enable you to get to the hedge, then with a light axe cut the plants half off *at the ground*, and press them back on the hedge at an angle from the ground of say 30 degrees to 40 degrees.

If laid too flat, the flow of sap is so obstructed that it will be diverted from the main trunk and centered upon a vertical shoot from the root, while the original plant will die. It also fails to make a hedge of sufficient height, if laid very flat.

While plashing, a plant should be left occasionally, say once in ten feet, to prevent strong cross winds from displacing the hedge. These plants should be trimmed up to the height you wish the hedge, and cut off, and the hedge pressed back on them, part on one side, and part on the other.

When the hedge is laid down, it should be trimmed to a uniform height and thickness, after which one trimming each year, in heat of summer, before the wood begins to ripen, will keep the hedge within due bounds.

This yearly pruning may be done with a good corn knife, if nothing

better is at hand, but should be done while the plant is yet tender and full of sap, as it is then much more easily accomplished. Probably the best implement yet offered to the public for this purpose is one manufactured at the Douglass Axe Factory, and is sold by dealers at three dollars each. It is much the shape of a corn knife, but is much heavier, and is wielded by both hands, with a long handle. With an implement of this kind, it will not be found a great job to trim any amount of hedge usually found on a farm of ordinary size.

Hedges thus kept, while they stand the fury of our prairie winds, and resist the encroachments of thievish animals, also give diversity and beauty to our prairie farms, and go far towards removing the tedious monotony which naturally attaches to a level prairie country.

THE SIBERIAN APPLE.

BY C. ANDREWS.

If we were to name a number of varieties of the apple as types of the best in quality for all purposes, we might mention among them, perhaps, the Early Harvest, Sweet Bough, Baldwin, Rhode Island Greening, Seek-no-further, and the fanciful Lady Apple

Could these and others like them be grown with certainty and perfection in every part of the country, it might seem that very little room would be left for improvement in that department of Pomology.

But would such be the case? Can we conceive of no desirable addition to our lists, even though all our best apples were constantly reliable in producing their annual crops of fruit? This certainly is putting the question in the very strongest terms of concession to those who would really have us seek-no-further for excellence in apples. For, as in everything else, we have old fogies in fruit culture—men who would have us believe that nature has no "germins" locked in her secret cuisine which can produce fruits capable of giving a new sensation to our palates, or supplying us with new sources of sustenance, delight, and abundance. But even when put upon these broad and liberal grounds, we believe that the foregoing question must be answered in the affirmative. To some it may be a surprise to announce that such fruits have already found their way into our markets, and are silently solving the question of their claims to recognition by the reports of veracious figures. The prices paid for fruits, when in direct and continued competition with others of the same season and in the same markets, ought to settle the question of their relative value for the purposes required. For, whatever may be said to the contrary, poor fruits can not long sustain themselves in competition with good, if the latter are in constant and abundant supply. The reason why coarse, showy apples sell, while dull, delicious ones do not, is that in most cases the delicious ones are not there, or have not become known, else they would sell in spite of more gaudy competitors. The Rhode Island Greening always sells, though it has no color. The Rawles' Janet is no beauty, yet in districts where it abounds, no apple can compete with it in market. Novelty and beauty may affect prices for a season, but the latter

is bound soon to become based on intrinsic value. This principle, however, of the popular estimate of fruits by their appearance does not, certainly, operate in favor of the class of fruits we are to consider. All varieties of the species commonly known as the Siberian Crab-apple are small, to begin with. The newer varieties are but little known, and when placed in market alongside of well known varieties, they are obliged to overcome the immense advantage of large size—an element as attractive in big apples as it is in big men; and I may add, often as deceptive! Crab-apples, like women, may be small, and handsome; but if, like them, they are not also "good for use as well as ornament," they will be rejected in the market. At any rate, the practical purchaser will seldom be caught the second time by the blandishments of mere beauty, (in apples.)

To show that the Siberian Apple is not without grounds of favorable comparison with the common apple, in point of quality and market value, it would only be necessary to show the uses to which the former is applied, and to give names, dates, places, quantities, and prices at which they are sold in our markets. Such testimony could be adduced in abundance, but would make this paper too ponderous for the present purpose. A few instances only can be mentioned.

Mr. A. Sharpe, of Lockport, N. Y., an extensive fruit-grower, in the heart of a splendid fruit section, raises Transcendent Crab-apples, and sells them at good prices. In 1869 he sent twenty barrels of this fruit to Boston, and realized fifteen dollars per barrel for them. In Burlington, Iowa, another fine apple region, we have it on good authority that the same fruit has been sold for four dollars per bushel. The market of Chicago is always well supplied with the best apples grown in Michigan and Ohio. Yet D. S. Dunning, of Jefferson, Cook county, sells annually Transcendents at three dollars to four dollars and a half per bushel, when the best common apples brought only five to six dollars per barrel. A mass of similar facts, comprising more than a hundred cases, from Maine to Minnesota, could be given, but these are sufficient as samples, showing that there is intrinsic value in the Siberian Apple. Would it not be sheer insanity to suppose that the mere beauty of this small apple so carries away the heads of people in these well-supplied fruit markets as to cause them to pay such disproportionate prices for a really poor fruit?

It may be asked, "What are the points of excellence which recommend these fruits? Superior *richness* and flavor for cooking, and convenience of preparation for use are the principal ones in the case of the Transcendent. Yet there are many Siberian apples that are good dessert fruits, ripening in succession, and extending the season through the winter and spring. Among those before the public, are Whitney's No. 20, and Tuttle's Sweet, for summer, and Marengo Winter, No. one and two, for winter and spring. Unlike the Lady apple, which is *only* valuable as a fancy dessert fruit, these Siberian apples are fully equal to the Lady apple in beauty and quality for the dessert, and are also unrivaled for cooking, drying, and conserving. Some of the highest horticultural authorities in

this State have, on actual test, found Siberians superior to the best varieties of the common apple for cooking. Brevity will not permit me to speak of all the points of merit, economy, and utility, which attach to this class of fruits; but enough has been shown to prove that even in their best provided districts this new species is demonstrating itself as a decided addition to the pomological treasures of the country. Certainly we can not believe that in this instance amelioration will go backward. In the impression already made upon the country by the irresistible logic of results that have been brought about by no charlatanry of advertising, or other fictitious means, we can not fail to discern the landmarks of genuine pomological progress. The present popularity of the Transcendent apple can not be accounted for on any other supposition. For never did any horticultural novelty reach such reputation and sale with so little trumpeting and push. Even its place of origin is unknown. It had no ardent friends or advertisers at the start. Mr. H. E. Hooker was among the first to desseminate it from Rochester, N. Y. He obtained it about eighteen years ago, but after a slight sale, suffered it to drop out, and for years he received not an order. It had a similar course in the hands of Messrs. Elwanger & Barry. If this fruit has not found its way into public favor by force of *merit*, how has it arrived there? Who has puffed it? What Pomologist ever described or ever noticed it until two years ago? On the contrary, it has had to carry the odious associations of the term "Crab," and fight its way against the prejudices of all classes. Yet it would be entirely safe to estimate that it has reached a sale of several millions of trees for actual planting within the last six years.

The Transcendent is only a type of others that are following in its steps—quietly introducing themselves without the clangor of oily tongues or clatter of steel pens.

I have thus far only alluded to the merits and success of the Siberian apples in the most favored fruit districts, for it is upon their true appreciation here, when fully known, that we can correctly base our estimate of their real excellence.

I am aware that it is in its relation to the extreme North that the Siberian species is generally referred to as the harbinger of pomological progress. But while its importance to that region can scarcely be exaggerated, yet if we were to claim any merit of originality in this discussion it would be in making the claim, that the improved varieties of the Siberian species were destined to make innovations upon the pomology of the whole country; and (without rivaling or displacing any of our best fruits) to make such desirable additions to it, as to form a distinct epoch in the progress of that ennobling

———————" Art
Which does mend nature—change it rather—but
The art itself is nature."

THE STRAWBERRY.

BY O. M. COLEMAN.

Lowly and humble, as the really good ever are, little need be said in its defence; having hosts of friends and few or no enemies. Happy the mortal possessed of the above qualities of mind and heart, succeeding measurably well in the great battle of life!

The object of this article is to give a few plain, practical thoughts on the *Strawberry*, as to varieties, manner of planting, cultivation, etc., etc.

The writer has had in cultivation, first and last, most of the leading varieties of the country; such as Early Scarlet, Crimson Cone, Austin, Russell's Prolific, Triomphe de Gand, Agricultural, etc., etc.; but has dispensed with all of them, and cultivates nothing but *Wilson's Albany*. However much may be said in favor of other varieties, it can not be denied that the Wilson (though perhaps a little sour), is still a fine, luscious berry, when ripe; an immense bearer; a splendid, showy, market fruit.

I would choose moderately dry land (under-draining undoubtedly would be well), plow deep; firstly, secondly, and thirdly, *manure well*; making the soil loose and mellow, and in good condition to stand a drouth, should it occur about the time the fruit is maturing, as our heroine needs much moisture.

What to plant—Would plant only new runners of the previous summer's growth.

Time to plant—Would plant as early as April, if possible, in which case your plants will be well started before much dry weather, and if the season is favorable, you will have a fine prospect for the coming year, provided you have kept the ground clean and loose, so as to allow the runners a chance to make a strike of root.

How to plant—For small beds, would put the plants in rows 18 inches apart each way, and let them run together; or, as some prefer, keep them in hills by cutting off the runners.

For large plantations, I would plant in rows three feet apart—plants 18 inches apart in the row. Keep clean with a horse and a hoe, letting the plants run together in the row, keeping the spaces clean and well stirred; failure and vacancies may be filled with the first runners.

Protection—In December, or about the time the ground freezes, cover the plants lightly (say two or three inches), with prairie grass, straw, or corn stalks. The grass is preferable, having no seeds. This will keep the plants from heaving out by the frost.

In the spring, as vegetation begins to start, uncover the plants, leaving the covering in the spaces as mulching, shading the ground and making it clean for the picking of the fruit. Would not cultivate at all till after fruiting; then with plow, cultivator, and hoe.

Plantations should be renewed, *i. e.*, new ones planted each year, as they will not bear well more than three seasons, the first *two* crops being the best.

With a little outlay for plants, some care and attention, every family having a garden spot may have all the delicious strawberries they need, just as easily as all the potatoes. Who will try it?

RASPBERRIES.

BY O. B. GALUSHA.

There has been such a magnificent display of representations of beautiful fruits, accompanied by an array of "first class" testimonials of the superior merits of each, pictured and published in the circulars and in all the agricultural and horticultural journals, during the last few years, as to bewilder the mind and unsettle the choice of almost every one who attempts, through these means, to learn what varieties are best suited to his purpose or adapted to his locality. Next to grapes and strawberries there is, perhaps, more risk in raspberries in this respect, than in any other species of fruit, tree, or shrub. If we consult the advertisements and pictures, we are assured that there are about fifty sorts (more or less), each one of which is the "very best in cultivation."

The credulous and hopeful purchaser buys almost at random among these varieties, and in a majority of instances finds—after one or two years' cultivating and waiting—that he has cumbered the ground with plants, to eradicate which he would gladly pay a sum equal to their first cost, so as to make room for some variety that has been tested and found good and productive in his own neighborhood.

Since thousands of dollars are thus yearly thrown away in our State, it is a matter of considerable importance to know what sorts are good and reliable.

Having traveled considerably in the central and northern parts of the State during the raspberry season, noting the characteristics of different sorts, and also having quite a number of "highly approved" varieties in cultivation upon my own grounds, I am prepared to judge of the merits of the more prominent varieties in this region.

First, and far in advance of all others for productiveness, throughout the territory indicated, stands the *Philadelphia*. In all soils and situations, where observed, it bears a third more than any other variety, and in sandy soil, fully double. It proves hardy here, though reported to have been somewhat injured in the tops, last winter, in the southern part of the State.

The fruit, though not as rich as many other sorts of red or purple berries, is of good size, pleasant, pulpy, and refreshing; and with "sugar to the taste" is relished quite as well as other varieties; it has been longer in season with me than any other sort, continuing, in sufficient quantity to well repay the gathering, up to August second (about ten days after the last picking of other sorts), and as late as August 6th fine berries

were gleaned from the bushes. These berries were the product of shoots thrown out from the main stem at or near the ground, the side shoots farthest from the ground generally ripening their fruit first. This prolonging of the season of the fruit is partially owing to the mode of pruning the bushes, which I will describe presently.

The Philadelphia is not as firm as the Black Cap varieties, but keeps pretty well, and will bear shipment in pint boxes any reasonable distance. This fruit, shipped in quart boxes, brought from five to ten cents more per quart in Chicago, last season, than the Cap varieties. The expression so often used by fruit-growers in connection with the Concord grape and Wilson strawberry may be applied to this variety, *viz*: "It is a variety that will do to *tie* to."

The *Doolittle* still maintains its position at the head of the Early Black Caps, though the Miami which immediately succeeds it in season is more prolific.

The *Mammoth Cluster*, claimed to be a new variety, is apparently identical with the "McCormick" or "Large Miami."

This variety is perhaps the best, all things considered, of all this class. The canes are strong, the fruit large, pulpy, of good flavor; and, growing in clusters, is readily gathered. It is a good bearer, though I doubt if it will produce more quarts to the acre than the old Miami, yet the superior size and good quality of the berries more than compensates for a little difference in quantity. I would plant as many of this sort, either for market or family use, as of all the other Black Caps together. I feel constrained to give a word of caution, right here, to those wishing to purchase the best of the Black Caps. It is probable that a hundred Doolittle and Miami (old) plants have been sold under the name of "Mammoth Cluster" for every one of the true variety sold. It is not enough for the purchaser to be satisfied of the good intentions of the vender, but should also be convinced that he (the seller) can discriminate in varieties, and knows what he is selling.

DAVISON'S THORNLESS.

"It will not scratch your hands." "It will not tear your clothes in gathering the fruit." "It is hardy and productive."

These, or similar encomiums, on this fruit heralded its advent, and have been flaunted in the face of every reader of agricultural and horticultural journals for the last two years. These were the very best baits that could have been thrown out, and hundreds of greenbacks have been caught thereby. As far as my experience and observation extended, the most of these averments have proved correct. It seems "hardy," and "does not scratch," as it is nearly free of thorns, and bears so little fruit that the owner has little occasion to come in contact with the bushes. It seems to be quite a harmless variety. It may, however, increase in productiveness, with age. The fruit is of good size and flavor.

The *Clark* has generally failed to realize the hopes of the planter. It is a moderate growing bush, an inveterate sprouter; bearing moderate

crops of very rich fruit It is scarcely hardy and not wholly reliable on this account.

The *Elm City*, which I have seen only at Lacon, is an early variety of the same class—said to be a good, uniform bearer. It bore a good crop this year. Fruit of high flavor.

Ellisdale is a rich fruit, but has a rank flavor which is not generally relished.

Naomi is too tender to be of value here, except with protection.

Among the yellow varieties, the *Golden Cap* seems to be the only one that gives uniform satisfaction. The fruit is of fair size, rich golden color, and very palatable. The *Minnesota* is a new yellow berry that I saw on the grounds of D. B. Wier, of Lacon. It was not bearing more than half the quantity of the "Golden Cap," planted near it, though Mr. W. assured me that "it beat the 'Golden Cap' last year."

There are many other varieties that "promise well," but which should be taken in homœopathic proportions until their superiority over well-tried varieties is fully established. A half dozen plants are sufficient to test a new variety. With my present knowledge of varieties, gained by an experience of twenty years in this State with very many recommended sorts, and by observations in many other fruit gardens, my selection of 200 plants for family use would be 100 Philadelphia, 25 Doolittle, 75 McCormick, or Mammoth Cluster. I would also add "just a few" plants of the "Golden Cap," to provide nice ornaments for the berry dishes, without detracting much from the refreshing deliciousness of the contents.

The mode of pruning above referred to, and which I have found to increase the size of the berries and amount of product, is as follows:

When the young canes have grown to be about three feet high, clip them down to about two feet. If allowed to grow taller before clipping, the plant will have lost valuable time, as the sap going to make the destroyed cane would have been building up wood for next year's use. When the buds have again pushed into shoots, clip these—both the upright and side shoots—to within six or eight inches of the main cane. A third clipping similar to the second may be found necessary. This mode of pruning gives stiff, large, upright canes, which will hold up a heavy crop of fruit, which can be gathered with less labor and vexatious scratching of hands and clothing than that from rambling bushes. The same kind of treatment is the best known, also, for the blackberry. Canes thus pruned ripen better, and consequently endure the winter better, than unpruned ones.

FRUIT LISTS.

VARIETIES OF FRUIT FOR THE ORCHARD. CHAMPAIGN COUNTY.

O. B. GALUSHA, *Secretary of State Horticultural Society:*

Dear Sir:—In accordance with your request, I will proceed to give you my views in regard to a list of fruits for the Commercial Orchard:

We must be admonished by the experience of Eastern orchardists that there are but a very few out of the many thousand varieties of fruits that have, on the whole, proved highly satisfactory.

If we go over the same ground, and prove the same thing in regard to the value of varieties for our State, we need not be disappointed. The Baldwin and Rhode Island Greening, which stand at the head of their lists, we have thrown aside as not proving as valuable with us. The Baldwin has shown itself a little tender in some exposures, and the fruit fails to keep as well. This is due, no doubt, to the higher average temperature of our summers, and the changing, open condition of our winters. If we would harvest the crop at maturity—say when the stem will part on lifting up—and keep in a cool, well aired cellar or room, these popular Eastern varieties would, no doubt, give us better satisfaction.

These remarks are applicable to all our apples and pears, and attention thereto will be found useful.

REQUISITES OF A GOOD APPLE.

The tree must be hardy, producing fair annual crops.

A tree with a round or spreading head will be the most certain to meet these requirements; more especially the latter.

A red color is the most popular; for in case of bruising, the injury is less apparent, and generally less serious, bruised places of such apples having a greater tendency to remain dry. Then the skin of the red apple is thicker and tougher than that of the yellow, thus enabling them the better to stand the friction of railroad transit. All other things being equal, the red apple will command the highest price in the market.

To sum up, the apple that will produce the greatest net profit is the best for the orchard, though we have not had a full opportunity to test this with exactness; yet there is such an apparent difference that we are able to reject at least ninety per cent. of the list of named apples.

Among those the best proved are

1	Red Astrachan	Summer.
2	Sops of Wine	"
3	Golden Sweet	"
4	Duchess of Oldenburg	"
5	Early Pennock	"
6	Keswick Codlin	"
7	Lowell	"

No. 2 may be placed at the head of the list; the others are of value in extending the season, and in giving a variety.

8	Fall Wine	Autumn.
9	Maiden's Blush	"
10	Rambo	"
11	Snow	"
12	Porter	"

Nos. 9, 10, and 11 are always in demand. No. 8 has been considered too tender to ship, but when carefully pressed into the package it will carry, and commands a higher price. No. 12 has not been so fully tested, but comes in seasonable time, and is growing in favor.

13	Stannard, Early	Winter.
14	Jonathan	"
15	Ben Davis	"
16	Rawles' Janet	"
17	Smith's Cider	"
18	Winesap	"
19	Willow	"
26	White Pippin	"

These are valuable for their several seasons, ranging from December to June, inclusive, a period of six months.

No. 13 is strictly an Autumn apple in the south part of the State, and is there liable to overgrow, crack, and speck; north of 40 degrees it has no rival in its season. Nos. 16, 17, 18, and 19, are very profitable, No. 19 being the more valuable of the long keepers. It is large, showy, keeps sound, and the tree is productive. It grows slowly in the nursery, but gives satisfaction in growth as it gets older.

Here we have about one per cent. of the named varieties, of which we may speak with some confidence.

On further trial we may find others of equal value; but the practical orchardist had better wait until they are tested, before he plants largely.

Then again there are varieties that do remarkably well in some locations; such as the Buckingham, at Cobden; the Newtown Pippin, near Alton; Minkler, at the North, and Gilpin for those who winter their apples in pits out of doors; and the Milam along the Wabash.

PEARS.

"I never knew a dear gazelle,
To please me with its mild blue eye,"

But then———it died.

So of the *Pear*. "In the midst of life, we are in death."

Up to the present year I have had a list of hardy varieties, small it is true, but now reduced to smaller numbers. Of those remaining, I will name:

1 Bartlett.
2 Belle Lucrative.
3 Buffam.
4 Louise Bonne de Jersey.

It is with regret that I leave the Onondaga out of the list, as it had given me great satisfaction, but suffered badly the past season.

I would call attention to the remarks of Parker Earle in regard to the value of the Bartlett, in his paper on the pear.

CHERRIES.

The May, or Early Richmond is the only cherry that has stood the test for the commercial orchard. In a few locations the sweet cherries have found their way to market, but even this small supply is growing less annually, while the Richmond is growing in favor.

The invention of the cherry stoner, by Mr. George Gore, of Galesburg, will add greatly to its value; as it may now be very cheaply canned. Orchards of this variety containing 500 trees each, are becoming common, while some number as high as 2,000 to 3,000 trees.

The Late Kentish, or probably the Kentish of Downing, is about two weeks later. This and the Large English Morello, that follows the latter two weeks, may prove valuable for canning, if the curculio can be kept from them.

The Richmond is a tolerable cherry for the table when fully ripe, and it may always be sent to market in that condition, if the fruit is plucked singly, with the stem on, not touching the fruit.

In packing, they may be gently pressed into the quart boxes, in order to prevent friction on the cars.

In order to make the apple orchard the more profitable, we must make vinegar of the refuse, cider of all the small, sound apples, retaining only the best for market; which will be found to be about one half of the crop.

I have ommitted the PEACH and PLUM in the list, as I have not sufficient personal experience to warrant an opinion in regard to varieties; and I suppose it is facts, not mere theories or vague opinions, that you desire.

Yours respectfully,

M. L. DUNLAP.

LIST OF FRUITS.

RECOMMENDED BY SAMUEL EDWARDS OF LAMOILLE, BUREAU COUNTY.

The following list embraces varieties that have been tested and found valuable here. My design has been to retain none but those which, for some good season, were deemed indispensable:

APPLES.

Early Harvest, Keswick Codlin, Red Astrachan, Dyer, Duchess of Oldenburg, Sweet June, Maiden's Blush, Soulard, Twenty Ounce, Lowell, Snow, Bailey's Sweet, Domine, Yellow Bellflower, Wagoner, Westfield Seek-no-further, Winesap, Jonathan, Roman Stem, Rawles' Janet, Ben Davis, Willow, Sweet Pear, Sweet Vandevere.

PEARS.

Doyenne de Ete, Bloodgood, Tyson, Bartlett, Flemish Beauty, Belle Lucrative, Seckel, Buffam.

CHERRIES.

Early Richmond, Large English Morello, Reine Hortense.

PLUMS.

Lombard.

GRAPES.

Concord, Clinton, Hartford Prolific.

STRAWBERRIES.

Wilson, Crimson Cone, Russell, Green Prolific.

RASPBERRIES.

Purple Cane, Doolittle, Miami, Philadelphia, Clark, Brinckle's Orange, Golden Cap.

CURRANTS.

Red Dutch, White Grape, Black Naples, Long Bunch Holland.

GOOSEBERRIES.

American Seedling, Houghton, Downing.

LIST OF APPLES.

BY S. G. MINKLER, KENDALL COUNTY.

Secretary of State Horticultural Society:

In complying with your request, to furnish a list of such apples as succeed well in my locality or region—comprising the counties of Kendall, Du Page, Will, Grundy, and La Salle—I give a list of those which have succeeded well with me, and with others, as far as I know, after twenty-five years' experience, and such as I would plant again, with reasons why I would plant them.

SUMMER VARIETIES.

The first on the list is the *Early Harvest*—not very profitable, but we have no variety to take its place.

Red June—Salable fruit tree; a good bearer; liable to overbear; a slow grower and hardy.

Benoni—The best in its season; salable tree; an upright grower.

Duchess of Oldenburg—Fruit always fair; good size; excellent for cooking; very salable.

Early Pennock—Fruit good size; tree a good bearer, and hardy.

Summer Queen—I have found it profitable; good size; skin tough, and stands handling well; tree a spreading grower; good bearer and hardy.

FALL VARIETIES.

Keswick Codlin—Fruit good size; quite tart; one of the best for cooking; very salable; tree an upright grower, and an abundant bearer, even while quite young.

Rambo—Good dessert apple; salable; tree not the hardiest, but a good bearer.

Lowell—A choice apple; good size; sells well in the market; tree hardy; a good bearer.

Fall Winesap—How it should get this name, I do not know. There is no red about it, and it should be classed among the white apples. It comes in a very good season, just before the Fameuse; a good apple; tree hardy.

Cayuga Red Streak—This is one of the good, large apples; I have found it very profitable; the tree is a good grower, and hardy.

WINTER VARIETIES.

Jonathan—An excellent apple; profitable; tree spreading, slow grower, and hardy.

English Golden Russet—A good apple; should be kept in the dark; tree large, spreading, good bearer, hardy.

Domine—Good fruit; sells well; tree a good bearer; open grower, and not the hardiest.

Winesap—Good from December to May; has the longest season of any apple that I grow; good for dessert and culinary purposes; sells well; tree hardy.

Yellow Bellflower—No discount on the fruit. It succeeds well with me on clay sub-soil, but is generally understood not to do well on gravelly sub-soil.

Minkler—I will say nothing about this variety, lest you may think I am "blowing my own horn."*

Ben Davis—Not the best-flavored fruit; of good uniform size; a good late keeper; tree very hardy; an enormous bearer and a very handsome grower.

Willow—The longest keeper; good size; salable late in the season; tree a good bearer, and one of the hardiest.

I would mention that the Rhode Island Greening and Esopus Spitzenburg have done very well with me. The trees are not very hardy.

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*NOTE.—This variety is acknowledged by all knowing it, within the territory named by Mr. M., to be one of the most profitable. The tree is very hardy, forms a large, spreading head, and bears regularly good crops of fair, red apples of a medium quality, which keep well into spring—*Secretary.*

I have sixty other varieties that I would not plant again, or advise others to do so.

SIBERIAN APPLES.

Of the Siberian family the Large Red, Yellow, and Montreal Beauty are good varieties, and one tree of each is sufficient for a family.

I have not consulted books in making this list, but have made my own comments.

Yours respectfully,

S. G. MINKLER.

LIST OF APPLES.

RECOMMENDED BY N. OVERMAN, OF CANTON, FULTON COUNTY.

SUMMER.

Early Harvest, Benoni, Red Astrachan, Red June, Sweet June.

AUTUMN.

Maiden's Blush, Green Sweeting, Fameuse.

WINTER.

Willow, Domine, Roman Stem, Smith's Cider, Fulton, Winter-Sweet Paradise, Rome Beauty, Belmont, Northern Spy, Winesap, Winter Swaar, Rawles' Janet, Jonathan, Newtown Pippin, Ben Davis, Cayuga Red Streak, American Golden Russett, White Bellflower.

LIST OF FRUITS FOR MACOUPIN COUNTY.

BY JONATHAN HUGGINS.

APPLES—SUMMER.

Early Harvest—Earliest; not most profitable; fruit perfect in 1870.

Sops of Wine—A sure shot every time; best early market apple.

Keswick Codlin—Does well also, and is profitable for market.

LATE SUMMER AND EARLY FALL.

Maiden's Blush, Porter, Rambo, Fameuse, Rhode Island Greening, Jonathan, and Baldwin.

WINTER.

Rawles' Janet, Northern Spy, Willow, Ben Davis, Pennock, Gilpin, Limber Twig.

PEACHES.

Hale's Early—We plant because of its earliness; but it rots badly.

Cole's Early (rots), Haine's Large, Early York, Early Crawford, Old Mixon, Smock, Morris White, Late Crawford, and Heath Cling.

CHERRIES.

Early May and English Morello.

QUINCES.

Orange and Rhea's Seedling.

CURRANTS.

Red Dutch.

RASPBERRIES.

Doolittle, Miami, and Philadelphia.

BLACKBERRIES.

Lawton and Kittatinny.

STRAWBERRIES.

Wilson.

GOOSEBERRIES.

Houghton's Seedling.

GRAPES.

The Concord is the main one planted. Of course we plant other varieties of fruits than the above, but these are the most certain and profitable.

HORTICULTURE IN LOGAN COUNTY.

Mr. O. B. GALUSHA, *Morris, Illinois:*

Dear Sir:—In response to your request, I will proceed to give you such local items of interest to Horticulturists as occur to me.

Our soil being a rich, sandy loam, or black, vegetable mould of from 1½ to 3 feet in thickness, with a pervious clay sub-soil, is well adapted to fruit culture, and all varieties of hardy fruits succeed admirably when not affected by blight, noxious insects, or unseasonable frosts.

I think that fruit culture judiciously managed would be fully as remunerative here as other branches of industry. Much depends on the varieties planted. The culture of small fruits for market has not been practiced to any great extent; but I believe could be made quite profitable at present. Corn, pork, and cattle are the great staples of our county, and Horticulture has been comparatively neglected; but our people seem to be taking more interest than formerly in this subject.

Our orchards are mostly on the prairie lands. I am not quite sure but that the value of shelter for orchards has been rather overrated. I believe that orchards on the open prairie have been fully as productive as those that are in sheltered localities, especially those that are situated on elevated ground in the open prairie.

I have sometimes noticed a lack of fruit on the west or southwest side of trees, which may be caused by the strong winds which prevail from that quarter about the time the trees are in bloom, blowing too much of the pollen from blossoms on that side.

I have also seen good crops of peaches on bleak, elevated sites in the prairies, when there was a complete failure in more sheltered situations. My father, some years ago, had a piece of land cleared off in the timber for the purpose of planting a peach orchard; but he became so thoroughly convinced that shelter was not necessary for peach trees, that he never planted it.

I should prefer hill sides, or at least well drained lands, for orchards; do not consider shelter essential; would not go into extremes in regard to low heads, and in our rich soil would not plant apple trees, to stand permanently, closer than thirty feet, and might plant peach or dwarf pear half way between the apple trees, and cut them out when they get in the way; would rather prefer fall planting; would mulch the first summer; cultivate well until the trees got large enough to take care of themselves, then seed down with red clover. It might be well to turn hogs in the orchard, first ringing their noses to prevent rooting, except in very old orchards; the hogs would eat up the fallen fruit, and thus destroy larvæ of insects. But one of the most important points with the orchardist is to know just what varieties to plant. It is very essential that he should post himself thoroughly in regard to the varieties which succeed best in his particular locality.

We have been experimenting with a great many varieties, and find that it will not do to adopt or reject a variety on too short acquaintance. Some seasons our favorite varieties prove almost complete failures; yet we do not feel justified in rejecting them on that account. We must consider the average productiveness and other qualities for a number of years before making up our verdict.

From our own experience, I would recommend the following list for this section:

SUMMER APPLES.

Early Harvest, Red Astrachan, Sops of Wine, Carolina June, Keswick Codlin, Pomme Royal.

FALL.

Maiden Blush, Jersey Sweet, Fameuse, Rambo.

WINTER.

Winesap, New York Pippin, Newtown Pippin, Fulton, Jonathan, Rawles' Janet, Milam.

PEARS.

Bartlett, Flemish Beauty, Buffum, Buerre d'Anjou.

CHERRIES.

May Duke, English Morello, and Early Richmond.

PEACHES.

Hale's Early, George the IV., Yellow Alberge, Crawford's Early and Late, Old Mixon, Coolidge Favorite, Royal Kensington, Early York.

PLUMS.

Lombard, Yellow Gage and Italian Damask.

GRAPES.

Concord, Isabella, Rogers' Hybrid, Nos. 3 and 4, Delaware, Hartford Prolific.

CURRANTS.

Red Dutch.

GOOSEBERRIES.

Houghton's and Downing's Seedlings.

BLACKBERRIES.

Lawton and Wilson.

RASPBERRIES.

Doolittle, Miami Black Cap, and Philadelphia.

STRAWBERRIES.

Wilson's and Green Prolific.

I think that our orchards have suffered more during the past year from insects and from blight than in all the previous years since the settlement of the country. Up to that time we had been pretty successful in pear culture; only now and then losing a tree from blight; but last year made almost a clean sweep of all the bearing pear trees in the neighborhood. Their ruined and blackened wrecks disfigure our orchards and grounds, and almost discourage all hopes of our ever succeeding again in raising this delicious fruit.

The destruction was so sudden and complete that it seemed useless to apply any remedies. The twigs of the apple trees were also considerably affected in the same way.

We can assign no cause for this unusual prevalence of blight; but think that it is owing to climatic influences. Perhaps the extreme wet summer of 1869 had something to do with it. We have never tried the root-pruning remedy; in fact have no faith in it, and find that trees that are standing in grass, and those that are well cultivated, are equally affected.

I am inclined to think that the fungus theory is the true one, and that wet seasons are most favorable for the spread of this fungus; and that where it can be done, cutting out and destroying the affected branches is about the only remedy.

The blight of the apple trees seems to be confined to the twigs, and is not so serious a matter.

In regard to last year's fruit crops: The apple trees set an unusually heavy crop, but it was very much thinned by the codling moth, which is becoming a very serious pest. Probably half the crop fell from the trees before maturity, and of the remainder, fully one-half was wormy. People are complaining that apples are not keeping well this winter. Of course it is the wormy ones that are rotting. The Winesap seemed the most exempt from worms, and produced heavy crops of handsome and salable fruit.

The Peach and Cherry crops were good. Cherries not so wormy as the year before.

Pears set pretty well, but the blight finished them.

Plums, as usual of late years, a complete failure.

Quinces ditto.

Grapes a fair crop.

Small fruits, of all kinds, a very good crop.

Respectfully yours,

C. S. Capps.

Mt. Pulaski, January, 1871.

HORTICULTURE IN THE ILLINOIS INDUSTRIAL UNIVERSITY.

BY T. J. BURRILL.

Illinois justly claims a proud prominence in the agitation and discussion which finally resulted in the munificent land-grant of Congress to the several states, for the purpose of establishing a system of schools, of high rank, whose main object should be, "to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

After the thorough organization of the State Horticultural Society, much was done towards securing and keeping together this valuable donation of Congress, both by the Society as such, and by its individual members. And since the inauguration of the University, no one ought to have, or has felt, a deeper interest in the workings of the school than the members of this Society. It is, therefore, meet that a few words be now recorded in regard to the work done in the Horticultural Department of the University at Urbana, Champaign County, Ill. True, but a short time has elapsed since even a beginning was attempted, and it is well known that horticultural operations require, aye demand time. The location of the University was finally settled May 8th, 1867, and the school went into operation the following March, 1868.

At first everything was new and crude, so that much time was necessarily consumed in getting ready to even make a start in a direction *known* to be right. No model existed from which to copy. Theories there were, but such as had never been reduced to practice. All had to be worked out from the mass of half-digested, often discordant opinions everywhere so freely offered. There were, however, upon the first Board of Trustees the following well-known gentlemen specially interested in

Horticulture: W. C. Flagg, O. B. Galusha, A. M. Brown, Samuel Edwards, M. L. Dunlap, Burden Pullen, and others; and in the first report ever made to this Board of Trustees upon departments and studies in the University, Horticulture, and horticultural science were recommended as a part of the practical education of students in the University.

See pp. 50, 51, first Annual Report of Board of Trustees.

Of the 980 acres belonging to the University, 135 acres, lying near the University buildings, have been set apart for horticultural purposes. In addition to this the forest-tree plantation is designed to cover 80 acres of the main farm. During the summer of 1867 nothing was attempted, save the grading and fencing of the college grounds. In November, 1867, at a meeting of the Board of Trustees, Samuel Edwards, O. B. Galusha, and C. H. Topping, from the Horticultural Committee, recommended a survey and mapping of the grounds, and in the following spring the planting of screens upon the west and north sides of the entire farming lands and trees upon the University grounds. This was adopted by the trustees, and the work was accordingly done.

By authority granted at this meeting of the Board (Nov. 26, 1867,) Jonathan Periam was chosen Head Farmer, and in January, 1868, assumed charge of the whole University lands, there being at the time no division between agricultural and horticultural domains. But he found the previous tillage had been so bad, and the ground so tramped and subject to still further inroads of stock, owing to bad fences, that little, comparatively, was done during the summer of 1868. (See his report p. 43 Second Annual Report of Trustees.) Still considerable work was done in setting out hedges, trees, etc., and testing a large variety of vegetables, under the direction of Mr. Periam, and in laying out and planting the ornamental grounds, under the supervision of the regent. Mr. Thomas Franks was employed as gardener, and entered upon his duties in June, 1868. This position he still retains. Dr. Warder, of Ohio, was elected Lecturer upon Vegetable Physiology and Fruit-Growing, March 11, 1868; but his first lecture was given January 12, 1869.

In September, 1868, W. F. Bliss entered upon his duties as Professor of Agriculture, having also temporary charge of the Horticulture. During this month, by order of the Executive Committee, a propagating house was built, which furnished a fine show of bedding and other plants upon the grounds the following summer. This committee also ordered the tile drainage of the forty-acre plat designed for horticultural uses, and after a careful topographical survey by Prof. Shattuck, the work was commenced. It has been prosecuted since, in spring and fall, as opportunity offered, and is now about half completed. This work has been done entirely by the students, under proper instruction. The drains are three to four feet deep, forty feet apart.

At a called meeting of the Board of Trustees, Nov. 18, 1868, the Committee on Horticulture made the following report, which was adopted, and the Legislature subsequently appropriated $20,000 of the amount asked for:

To the Board of Trustees of the Illinois Industrial University:

The Committee on Horticulture respectfully beg leave to report.

Section seven of the Act of Incorporation, among other things, authorizes the Board of Trustees to "establish and provide for the management of such model farms as may be required to teach, in the most thorough manner, such branches of learning as are related to agriculture and the mechanic arts."

As a part of such model farm, and for the more perfect demonstration of that department of agriculture known as horticulture or garden culture, we beg leave to make the following recommendations:

The plat hereunto attached as a part of this report, marked A, exhibits the ground plan of the grounds proposed to be occupied, and the schedule shows how they may be planted, and also contains the list of forest trees recommended for trial.

No extended argument is required at this time to prove the need of teaching the cultivators of the soil the importance of forest tree planting, of orcharding, and of other departments of gardening.

In regard to the orchard proper, the most important feature that we now recommend, is the procuring and planting of samples of all the improved varieties of fruits for identification and for comparison—a sort of fruit-tree museum of varieties, that will be at all times accessible for reference.

The management of the orchard, vineyard and garden will more properly come under the care of the Professor of Horticulture, or head gardener. But we would urge that the grounds reserved for the orchard be occupied for that purpose at as early a day as possible. The estimate for the cost of trees will be found in the schedule, but that for labor and other material are combined in the ground plan, and its proportion, to some extent, must be left to the discretion of the person in charge of the improvements.

The great feature of these grounds, and what is of paramount importance, at this time, to the whole people of the State, is the planting of forest trees for useful purposes. It is a new demand upon their industry and upon their lands, from which they can not fail to reap the most valuable results.

The new condition of things, created by railroads and improved agricultural implements, presents new industries, both to the cultivators of the soil and to the mechanic, in which they have a mutual interest. The forests are rapidly disappearing, or at least those useful trees that have a commercial value, and yet many of the new demands have not been met, nor is the old supply likely to hold out. But, if the forests of Michigan, Wisconsin, Minnesota, and Indiana were adequate to the demand, as a matter of economy in freights, if not in the superior quality of our second-growth timber, especialy of the deciduous varieties, it is an object to grow them at home, rather than to buy them.

Timber for railroad ties, culverts, cars, roadways, and buildings, fencing, vineyard stakes, hop poles, stanchions for coal banks; soft wood, like

white willow and the poplars, for berry boxes, crates and staves; hoop poles, wagon and carriage material, agricultural implements, and the multiform wants of the age, make up a demand of most surprising magnitude, that will add to our rural industry an importance that the most sanguine have not hitherto dreamed of.

If we look at this as simply the demand of agriculture, it must be conceded that it is legitimate, and ought to be granted without an objection; but we have added to this the claim of the mechanic, who is also largely interested, for it will enable him to compete with those of other states in the supply that commerce demands.

The state that sells the raw products of its soil is never rich, while the states that manufacture for others do well; those that grow the raw material and manufacture it at home are the most prosperous. No doubt the State of Illinois had these facts in view when it established this great school of the industries for the especial benefit of those two classes who create the wealth of the State.

There are in this State about eighty species of forest trees, besides the larger shrubs. With the exception of the oaks, yellow poplar, and hickory, we have not drawn largely from our native forests; and to-day we purchase nearly all of our timber. Nearly all of the ash timber used for agricultural implements, a part of our fence posts, and a portion of our railroad ties come from other states. Added to these is the greater part of the material for our wagons and carriages, when not wholly manufactured in other states; timber for railroad cars, and hard wood lumber for many other useful purposes, that ought to be grown near the place of manufacture.

To bring these useful trees within the bounds of culture and to utilize them, is one of the objects of this industrial institution. To teach the people of the State how to add these products of the forests to their other crops, and thus add millions of dollars annually to the wealth of the State, to give labor a wider range and a more comprehensive field for its employment, are objects worthy of such an institution.

Thousands of acres of timber can be planted in shelter belts, to check the winter wind that comes down from the north, with its polar cold, destroying the plants that the genial summer, fanned with the breath of the tropics, has made to flourish on our open plains. Wall in these prairies of Central and Northern Illinois with belts of conifers and deciduous trees, and we shall have one of the best climates; genial and equable, and with the best soil in the Union, with a geographical position midway between the two oceans, over which must pass a large part of the commerce of the world, and if we are not laggards in the world's progress we may reap from such surroundings a rich reward.

The Committee have divided these thirty species of useful forest trees into three classes, according to their supposed value for the demands of commerce and for domestic use. In the first class they include the European Larch, Austrian Pine, and Norway Spruce, native trees of Europe, and the Osage Orange, native of the Southwestern States. In the second and third class, White Willow, a native of Europe; Black Spruce, and

Norway Pine, natives of the more Northern States; thus making up the list with four European varieties, three from other states, and twenty-three species from the forests of Illinois.

Our other native trees, of minor importance, will find a place in the aboretum, where those of other sections of this continent and of Europe may be tested side by side. It is probable that among them may be found many of value.

The ten acres reserved for a commercial garden and grounds—for testing new varieties of plants—for comparing and further testing old ones—for proving new modes of culture and testing new implements—can not fail of proving useful, especially to those students who remain at the University during the spring and summer, occupied in some "industrial avocation." As the larger part of this plat of ground will be devoted to a market garden it is hoped that it will prove to be a paying investment.

We recommend the planting of an Osage hedge around the two hundred acres embraced in the plat.

We recommend that so much of lot Y, as is suitable for the purpose, be planted to an experimental orchard of the apple; two trees of each variety; the rows to run north and south, twenty-four feet wide, and the trees twenty-five feet in the rows; the trees in each tenth row to consist of Norway Spruce. In this connection, we also recommend that the offer of A. M. Lawver for duplicates of his collection of varieties, be accepted, and the proper order drawn for the amount.

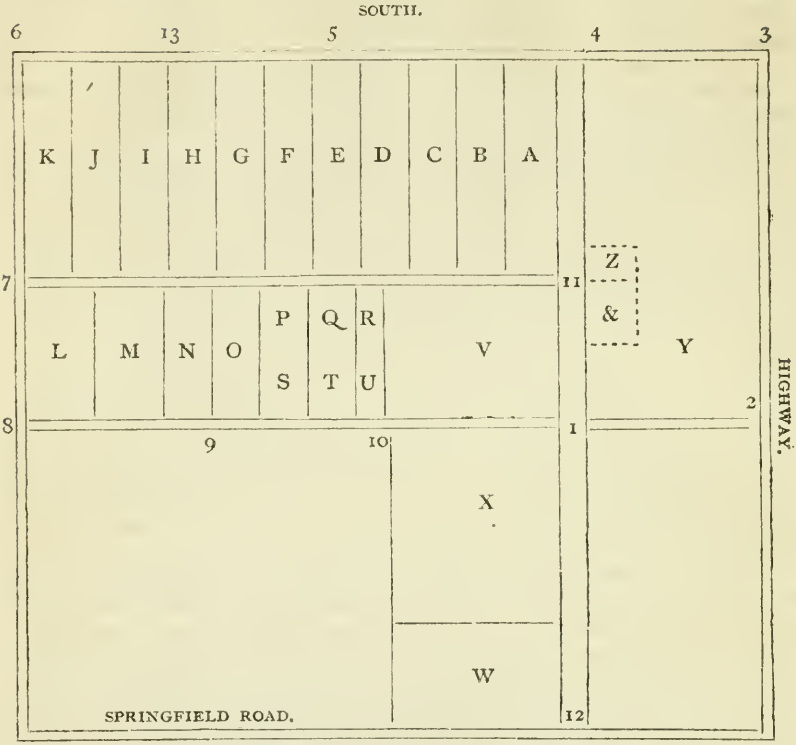
We also recommend that there be an additional experimental orchard of twenty acres, to be located on the stock farm (Busy farm), for testing varieties of the peach, pear, plum, cherry, quince, apricot, nectarine—two trees of each variety, to be planted in rows sixteen by sixteen feet, with every tenth row running north and south, planted with Norway spruce. Pears to be both standard and dwarf; one half of the dwarf pears to be planted eight feet in the row, thus: 8 by 16 feet. The relative value of standard trees and those on quince stock to be tested with same varieties, both as regards market value and quality. Cherries to be tried on Morello, Mazzard, and Mahaleb stocks. The whole to be surrounded with a double row of Norway spruce, set eight feet apart. The site selected to be the highest point, or points, best adapted to the purpose.

Also, one acre of vineyard, two plants of a variety, and so planted as to test the relative value of different modes of training and pruning.

Also, that lot B of the plat, containing one acre, be devoted to testing new varieties of the small fruits. It is probable that at some future time it may be found advisable to extend the plantation of small fruits for market, for the purpose of giving employment to those students who may, in accordance with the law, desire to remain in the University during the summer.

We also recommend the formation of an arboretum, to be located north of the new street running east and west on the forty acre tract, to contain about ten acres, and marked on the plat "W." So far as practicable to make the same ornamental, on the ground plan of a park, for the use of the University, and the citizens of Urbana and Champaign.

PLAT A.—SCHEDULE.



Shelter belt of two rows of trees, the one sixteen feet inside of the hedge, and the other eight feet therefrom, and trees eight feet in the rows, as follows:

From 1 to 2, 80 rods European Larch.
" 2 " 3, 108 " Norway Spruce.
" 3 " 4, 80 " White Ash.
" 4 " 5, 80 " Austrian Pine.
" 5 " 13, 40 " Silver Maple.
" 13 " 6, 40 " White Pine.
" 6 " 7, 60 " Arborvitæ.
" 7 " 8, 48 " Green Ash.
" 8 " 9, 60 " Red Cedar.
" 9 " 10, 60 " Blue Ash
Ave. 1 " 4, 80 feet wide.
" 7 " 11, 66 feet wide, and may be slightly curved.
Alley west of "A" 33 feet wide.
Alley west of belt 33 feet wide.
An Alley A to K 24 feet.
Alley between———24 feet.
Half of street 6 to 8, 33 feet.

Lots A to K, each 188 feet wide, and 908 feet long.
" L, M, N, O, each 260 feet wide, and 669 feet long.
" P, S, Q, T, each 260 feet wide, and 335 feet long.
" U, R, each 128 feet wide, and 335 feet long.
Lot V, 10, 17-100 acres, 669x662 feet.
" X, about 26 acres, excluding streets.
" W, Arboretum, about ten acres.
" Y, inclosure for Apples, about 43 acres.
" Z, one acre for Gardener's residence.
" &, two acres for Superindent's house and outbuildings.
Avenue 1 to 12, 80 feet.

USEFUL TREES—FIRST CLASS.

Lot A, 4 acres European Larch.
" B, 4 " Osage Orange.
" C, 4 " White Pine.
" D, 4 " White Ash.
" E, 4 " Austrian Pine.
Lot F, 4 acres Green Ash.
" G, 4 " Arborvitæ.
" H, 4 " Blue Ash.
" I, 4 " Red Cedar.
" J, 4 " Norway Spruce.

SECOND CLASS.

Lot K, 2 acres White Sugar Maple.
" " 2 " Black Sugar Maple.
" L, 2 " American Chestnut (10 bushels nuts).
" " 2 " Shellbark Hickory—nuts.
" N, 2 " Cucumber.
Lot N, 2 acres Norway Pine.
" O, 2 " Silver Leaf Maple.
" " 2 " Tulip.
" M, 2 " White Willow.
" " 2 " Black Walnut.

THIRD CLASS.

Lot P, 1 acre Red Maple.
" " 1 " White Elm.
" Q, 1 " Red Elm.
" " 1 " Butternut (nuts).
" R, 1 " Catalpa.
Lot S, 1 acre Hemlock.
" " 1 " Basswood.
" T, 1 " White Oak.
" " 1 " Black Spruce.
" K, 1 " (South end) Burr Oak.

The White Pine, Austrian Pine, Norway Spruce, and Hemlock, to be planted 8 by 8 feet; all others 4 by 4 feet—the former requiring 680 trees to the acre, and the latter 2,720. The above distances to be varied to some extent, by way of experiment, to ascertain, by actual trial, the proper distances for the planting of the several species.

We would recommend that the Legislature of the State be asked to make an appropriation of eleven thousand dollars a year, for two years, for the above purpose.

B. PULLEN,
S. EDWARDS,
O. B. GALUSHA.
M. L. DUNLAP,
W. C. FLAGG.

At this meeting it was voted to purchase 3,000 apple trees, two of a variety, and plant them for experimental purposes upon the west end of the 160 acre plat. Accordingly, about 1,350 varieties, two trees each, are now growing thriftily upon ground referred to.

Beginning January 12, 1869, Dr. Warder gave twelve lectures upon Fruit Growing to the entire body of students, awakening much enthusiasm upon the enticing subject. Upon this same date was inaugurated an annual lecture-course of about two weeks, devoted to Agricultural and Horticultural topics. Among the lectures for 1869, Jonathan Periam gave two, "Potatoes" and "Root Crops"; Dr. Hull, "Orchard Fruits"; Geo. Husman, "Grapes"; Samuel Edwards, "Small Fruits"; T. J. Burrill, "Agricultural Botany"; J. H. Tice, "Vegetable Physiology and Economy", and O. B. Galusha, "Timber Growing".

In March, 1869, Mr. H. K. Vickroy was employed as orchardist, which position he still retains.

At the annual meeting of March, 1869, the Horticultural Committee was made to stand as follows : A. M. Brown, Pullen, Galusha, Pearson, and Edwards. This Committee concurred in the plans already given, and recommended certain appropriations for carrying out the plans of the Committee. (See page 81 of Second Annual Report of Trustees.)

After amending, authorizing Prof. Bliss to purchase and receive the trees, the Committee's report was adopted. During the fall and winter of 1869, Prof. Bliss contracted for the following trees, which were received and planted, mostly in nursery rows, in the spring of 1870:

From W. A. Nourse, Moline, Ill.,
- 20,000 White Ash.
- 10,000 White Sugar Maple.
- 6,000 White Elm.

From D. B. Wier, Lacon, Ill.,
- 7,300 Silver Maple.
- 600 White Ash.

From Samuel Edwards, La Moille, Ill.,
- 14,000 Norway Spruce.
- 2,000 Norway Pine (*resinosus*).
- 2,000 Butternut.
- 2,000 Black Spruce.
- 8,000 White Willow (cuttings).
- 6,000 Tulip.
- 8,000 White Pine.
- 8,000 Black Sugar Maple.
- 4,000 Bass Wood.
- 3,000 Hemlock.

From Storrs & Harrison, Painesville, O.,
- 6,000 American Chestnut.

From Robert Douglass & Son, Waukegan.
- 250 American Arbor Vitæ.
- 50 Red Cedar.

To these there were added in the Spring of 1870:

From F. K. Phœnix, Bloomington, Ill.,
- 130 White Elm.
- 170 White Pine.
- 88 Sugar Maple.

From Messrs. Boatman & Co., Champaign, Ill.,
- 2,500 Osage Orange.

From Purdy & Hance, South Bend, Ind.,
- 11 Varieties Grapes.
- 4 " Currants.
- 2 " Gooseberries.
- 14 " Raspberries.
- 15 " Strawberries.

From Ellwanger & Barry, Rochester, N. Y.,
10 Varieties Grapes.
3 " Currants.
2 " Gooseberries.
4 " Raspberries.
8 " Strawberries.
100 Mahaleb Cherries.
100 Anger's Quinces.
100 Pear Stocks.

From M. L. Dunlap, Champaign, on Champaign County donation, Nursery stock, etc., amounting to $2,500.

From Arthur Bryant, Princeton,
4 Barrels Butternuts.
2 " Walnuts.

From W. C. Flagg, Moro, Ill.,
Catalpa Seed, donated by him.
8,000 Seedling trees now in nursery.

From Samuel Edwards,
18 Varieties Pear trees.
15 " Apple trees.

From Storrs & Harrison, Painesville, O.,
600 Concord Grape-vines.
200 Ives "
100 Delaware "
100 Hartford "
100 Creveling "
50 Clinton "

And some other things, of which the record is not now at hand.

During the summer of 1869 the gardener's house was erected, and has since been occupied by Mr. Franks. At this time was attempted the commercial garden provided for in the Committee's report already cited, and while the proceeds did not so nearly as hoped meet expenses, the practical lessons gained, and the labor furnished students, made it a prominent feature of the horticultural work of the season. The same may be said of the garden for the summer of 1870. Many kinds of vegetables and garden crops were tested, and some account thereof published in the public prints. At the March meeting, 1870, the Horticultural Committee was made to stand as follows: Brown, Pullen, Galusha, Pearson, and Dunlap. T. J. Burrill was elected Professor of Botany and Horticulture, and immediately assumed charge of the department. During the summer the chief attention was given to the tree plantations and the vegetable garden. Yet the ornamental grounds were not neglected, and in the latter part of the season shone in peerless beauty. A fine green-house was erected and partially stocked with plants. This will be filled next season in accordance with arrangements already made. A barn near the gardener's house was built this summer.

The plans for the future may be be briefly summed up as follows:

The planting, on a large scale, trees for shelter and for timber; the testing of the largest variety possible of fruits and vegetables; the culture of a few varieties of small fruits and other crops for profit, and to furnish labor to students; together with extended experiments in tillage and propagation, while, at the same time, classes will receive instruction in such sciences and practical matters as will the better fit them for advancing the great horticultural interests of our State and those adjoining. Cabinets, already begun, are to be largely increased, showing collections of seeds, woods, fruits, etc., which shall be as attractive as new. It is hoped, too, that much may be done towards establishing the facts now only partially known or accepted, about insects, birds, moles, etc.

The following course of study is suggested for those proposing to become horticulturists:

FIRST YEAR.

TERMS.

1.—Chemistry, Geometry, English or Latin, History—two Lectures per week.
2.—Chemistry, Botany, English or Latin, History—two Lectures per week.
3.—Chemistry, Botany, English or Latin, Lectures on Agriculture, etc.

SECOND YEAR.

1.—Soils and Fertilizers, Botany, Surveying, Chemistry or German.
2.—Chemical Treatment of Soils, Zoology, " "
3.—Mechanical " " Entomology, " "

THIRD YEAR.

1.—Fruit Growing, etc., Comparative Anatomy, French or History.
2.—Nursery work, Plans, etc., Geology, French or History.
3.—Garden and Small Fruits, Political Economy, Book Keeping, French or History.

FOURTH YEAR.

1.—Hot and Green Houses, Rural Economy, Literature.
2.—Rural Architecture, Meteorology, History of Civilization.
3.—Landscape Gardening, Geology of Illinois, History of Philosophy and Inductive Logic.

Like all other courses of study in the University, this is only suggestive. A student may take it all or choose such parts as he likes, but the times at which the different subjects will be taught as are indicated.

Donations to the Horticultural Department have been received from a large number of nurserymen, implement manufacturers, dealers in seeds, and florists, of their several manufactures and products, aiding the

Trustees in making this department more useful in illustrating and practicing the various improved modes of culture, and in largely increasing its stock in almost every branch of its operations, besides demonstrating the general, wide-spread interest which is felt in its success throughout the State.

HORTICULTURAL HISTORY.

JO DAVIESS COUNTY.

O. B. GALUSHA, Esq., *Secretary Illinois State Horticultural Society:*

Dear Sir:—Yours of the 22d ult., asking for an account of my experience in Pear culture, etc., is duly received and contents noted. I regret that I can communicate so little that would be of interest in the direction indicated.

In the fall of 1854 I purchased of Ellwanger & Barry, Rochester, N. Y., from 150 to 200 pear trees—standards and dwarfs—and planted in the spring of 1855 on a piece of ground that had long been in cultivation—eastern exposure, clay sub-soil. These trees did well, but the cold winters of 1856 and 1857 injured them, and many of the trees were killed down to the ground. But those recovering bore me one or two fine crops of pears, equal to any in the State. After this profuse bearing, the trees began to blight, and many of my best trees died out; but from a second growth from the stump, and from those that continued in a crippled state, I have had an abundance of fruit for family use, but no surplus for sale, with the exception of one or two years. The past six years I have permitted my pear orchard to run to blue grass, and the trees have less blight, but the fruit has not been quite so abundant, nor of so good quality, as when cultivated, but I have probably more living trees.

I have found no profit in pear culture, yet I am not prepared to say that to one well understanding the business, and with good location, soil, etc., it could not be made to pay. My own experience would lead me to the following:

That to attain success in pear culture in this latitude, with a clay subsoil, such as we have, good, hardy varieties should be selected, soil in good state of cultivation, well drained naturally; if not, artificial drains must be made, either by tile or by sinking shafts though the clay to the rock or strata that will drain, and filling up with coarse material; and upon or near these shafts set the trees, either dwarfs or standards. Plant deep, if well drained, not otherwise. Cultivate moderately, or mulch. Protect on west and north with belts of timber. Plant and train trees with low tops; be prepared to reset annually a few trees to take the place of those lost by accident or otherwise. This will apply to apples as well as pears. This is not a natural climate for fruit, and consequently a little more care must be given to culture, as we find the case in many or all agricultural pursuits as far north. Cattle in Texas will thrive and

be profitable without care; grapes in California produce abundantly in their wild state, whilst in Northern Illinois cattle can only be made profitable with the best of care. and with it grapes, as we know, can be profitably grown. In each case where so much care, by reason of climate, is made necessary for success, we find the quality of the matured article, or growth produced, much improved thereby. It is so with the pear. The quality of those raised here can not be surpassed. I have raised samples of the Duchess de Angouleme weighing twenty-five ounces, and of very fine quality.

We have many good farmers, who have made fruit culture only incidental, who will say fruit-raising is not profitable, and all because they do not devote as much attention to this branch, and do not give their trees credit for the bushels used by their large family of children and the many more bushels allowed to waste for the want of attention whilst they are seeking profit from some other branch of their business to the neglect of this. Place these same orchards in the hands of others, who, from a limited amount of acreage for other crops, are compelled to see after this interest, to the sale of all surplus, and we see quite a different result.

Of such, we have many examples in this county. Men who have accumulated money, built good houses, etc., all from the product of their orchards. But such we find have made choice (by accident or otherwise) of some naturally well-drained and sheltered location for their enterprise.

I have sometimes found a few remaining trees—in good bearing condition—of some old pioneer orchard thirty to thirty-five years planted, whilst the orchard has disappeared, and have been led to seek a cause for this; and upon close investigation have found that some old washed-out roadway, eight or ten feet in depth, has furnished drainage to such trees. In other cases, I have found a well from which the farm has received its supply of water the cause; and again, a drain laid to drain the cellar, giving life and usefulness to these old relics of the past. From such out-croppings in favor of drainage, we should be quick to receive instruction; but we too frequently pass over such teachings, preferring to be teachers rather than to be taught.

The old mining lots (perforated with shafts as they are) in this vicinity will at some future day be found to be our very best locations for fruit-raising.

Yours, very respectfully,

R. S. NORRIS.

GALENA, December, 1870.

RICHLAND COUNTY.

O. B. GALUSHA, *Secretary, etc., Morris, Ill.:*

Dear Sir:—Replying to your communication of Nov. 7, I submit the following facts:

In 1822, James Parker planted the first orchard in the southern portion of Richland County. There were seven or eight varieties of apples in

said orchard, but I have the names of only two—Rawles' Janet and Pennock or large Romanite. This was planted in prairie soil, and cultivated for about twenty years, as other farm land, in corn, wheat, oats, etc.

The orchard yielded well during the twenty years it was cultivated; afterwards it was left to grow over with grass and weeds, and as soon as the cultivation was neglected the orchard began to decline.

In 1825 and 1826, several orchards of seedlings were planted, and those that have been well cultivated have been thrifty and have borne well.

About the year 1836, J. M. Park planted an orchard of about three hundred grafted trees, but the names were not given. In 1845 or 1846, Park left his farm, and a number of the trees have died for want of proper care.

In 1834, I planted an orchard of about forty trees, procured from a Mr. Woods, near Albion, Edwards County. I did not get the names, but they were good varieties. Having no experience, I took the advice of others, and planted them about two feet deep, which I found by experience to be a mistake, as many died and the remainder were only saved by high cultivation—new roots starting near the surface.

In 1858, planted one hundred and fifty from Knox nursery, Vincennes, Ind. The varieties that have borne most, and been most profitable are Early Harvest, Early Pennock, Carolina Red June, Ben Davis (the most salable), and Winesap, and Rawles' Janet (the best bearers).

We shipped to Chicago at one time, but owing to the delay on account of re-shipping, it did not pay, and our market has latterly been local or in Cincinnati.

Dr. Samuel McClure, of Olney, has been kind enough to furnish the desired information relating to peaches and all varieties of small fruits grown here, which I inclose herewith.

Very respectfully,

GEORGE MASON.

OLNEY, RICHLAND COUNTY, ILL., Dec. 16, 1870.

O. B. GALUSHA;

Dear Sir:—George Mason Esq., of this vicinity, handed me your letter of inquiry, relative to fruits grown in Richland County, requesting me to reply to it. I comply as follows:

Peaches are more generally grown than any other fruit; probably on account of their easy propagation and their earliness and certainty in bearing. In no year since my residence in the county, now twenty years, has there been a total failure.

Some orchards, containing from forty to fifty acres each, which have been planted on the prairies within the last five years, have been very successful. A gentleman residing in Ohio, who furnished the trees and had them planted and cultivated "on the shares," realized nine thousand dollars net profit in 1869, from those growing in this county. He has other orchards in Ohio and on the Central Railroad in Illinois, but his orchards in this county have been the most remunerative, excelling those at other places in the superior quality of the fruit, and certainty in bearing.

Troth's Early, Old Mixon Tree, Smock Free, and Heath Cling are the best bearers.

Pears are but little grown except in gardens, where they seemed to be free from disease until two years ago. Blight has destroyed at least one-third of the trees: all varieties seeming alike susceptible to its ravages.

It may possibly be caused by climatic influences, and if so, we may entertain the hope that we will have another period of freedom from its destructive effects.

Grapes are but little grown for wine: Concord is the most popular variety; Catawba is liable to rot, except when trained on the side of a house or barn, and in my experience no blight or rot ever attacks it when grown in that way.

Iona and Rogers, No. 15, are the most delicious grapes we have for the table, and have nearly equaled in productiveness the Concord.

Taylor's Bullit I have banished from my grounds on account of its peculiar liability to attacks of the "*Procris Americana*."

Plums and Apricots blossom and produce fruit in abundance, which is destroyed by the Curculio long before coming to maturity.

Blackberries—A number of varieties are indigenous in this section of the State, and when transplanted into the garden, never produce fruit equal to that obtained before removal. I have grown the Lawton for a number of years, and it has always escaped being winter-killed.

Strawberries are but little grown for market. Wilson's Albany is the most productive variety. Longworth's Prolific will continue to produce good fruit a greater number of years, without removal, than any other variety: others produce one or two good crops, after which they are unproductive.

Raspberries—Philadelphia, Miami, and Purple Cane are our most productive varieties.

Cherries—Early May bears well; Gov. Wood and Yellow Spanish do the best of the more tender varieties.

Mr. Mason has written a report on the Apple.

We have no Horticultural Society in this county, but there is a great deal of taste displayed in the embellishment of our home-grounds, with trees and flowers.

Yours, respectfully,

SAMUEL MCCLURE.

CHAMPAIGN COUNTY.

BY H. J. DUNLAP.

This county is located nearly on the same latitude as Springfield, and is traversed by the Illinois Central R. R., running from Chicago to Cairo, the Indianapolis, Bloomington, and Western, and the Toledo, Wabash, and Western, running east and west.

It will be seen that it has the advantage of markets in all directions, an item of no small value to the fruit grower.

Its surface is generally undulating; enough so to give good drainage. There are no large streams in the county, but several small ones have their sources in the northern part. Running through the center from N. W. to S. E., is a ridge, which forms a water shed, from which the water runs west to the Mississippi and east to the Wabash.

All of these small streams are bordered by heavy growths of timber, which is, however, being rapidly destroyed by the artisan's axe.

The entire county is supposed to be underlaid with coal, but as yet no successful efforts have been made in reaching it.

The soil of the county is the ordinary black loam of the prairies. Occasional deposits of sand and gravel are found scattered through it.

The first orchard planting of which I have been able to obtain any information, was done about the year 1838, by William Sadoras, in the timber near the southwest corner of the county, now called Sadoras' Grove. It was made of 50 Milam sprouts obtained near Terra Haute, Indiana, 80 miles distant, and afterwards extended by planting 150 more of the same sort. These trees commenced to bear in 1834, four years after planting, and continued to produce large annual crops until 1854 or 1855, since which time there have been several failures, and many of the trees are now dead or dying. Several years after the orchard was planted, some of the trees were grafted over to Vandevere Pippin, Yellow Bellflower, Roxbury Russet, etc. Some of these varieties have borne good crops, the V. Pippin being especially productive, but not of very good quality. The Roxbury Russet does not bear large crops, and is not a very good keeper. This orchard is in a cove in the timber, protected on the south, west, and north. Mr. Sadoras is still living, and takes quite an interest in Horticulture.

Many other orchards were set out in this neighborhood from the sprouts produced from these Milams. The only valuable apple that was planted seems to have been the Milam.

Several years after Mr. Sadoras' planting, orchards were set at or near Big Grove, near Urbana, by James T. Roe, Robt. Brownfield, —— Fielding, Martin Rhinehardt, James Clemens, Wm. Robert, and others. James T. Roe had a small nursery which consisted principally of Milams. Mr. Brownfield procured one hundred trees from Kentucky, mostly Milam, Winter Wine (?), and Yellow Bellflower, which continue healthy, and bear good crops.

Martin Rhinehardt's orchard consisted of Bellflowers, Vandevere Pippin, Seek-no-further, Winter Wine, Fall Pippin, Pound Sweet, and Pumpkin Sweet. Mr. Brownfield now owns this orchard, also the one of one hundred trees originally planted by him. Four years ago the first one hundred trees yielded 400 bushels. This season both orchards had only 600 bushels. There had been no insects to diminish the yield of fruit until two years ago, when the codling moth first made its appearance in numbers sufficient to destroy nearly the entire crop. Mr. B. turned in his hogs to eat the fallen fruit, and thinks, had they been kept in it all the season, that he would have headed the moth; but as soon as the fruit was large enough to sell, the hogs were removed. The fruit was not picked up every day, so that a sufficient number of worms escaped to injure the past season's crop, but not to as great an extent as the preceding one.

Josh Trickle planted twelve seedling trees at an early day, some of which are now dead, others remaining thrifty and fruitful.

Mr. Brownfield thinks the Green Winter Pippin (?) his most valuable winter apple. The Rawles' Janet is one of the best keepers. Large Romanite was also planted quite extensively by the early settlers. The principal varieties brought to market from the old orchards, are Milam,

Pennock, Vandevere Pippin, Yellow Bellflower, Rawles' Janet, and Winesap.

It is almost impossible to find a good eating apple in either Champaign or Urbana during fall or early winter, except Milams; but Snow, Rambo, Porter, and some others of the newer varieties, begin to make their appearance from the later planted orchards. Of these there are quite a large number commencing to bear. Prominent among these are the orchards of M. L. and M. Dunlap, J. B. Phinney, C. F. Columbia, R. Allen, and others.

Until 1856 there had been no established nursery in the county, but several parties had kept small stocks sent from abroad to be sold here. Nearly all the trees, prior to that time, came from the Rochester nurseries, and were mostly Baldwins, Northern Spys, Russets, Greenings, etc., nearly all of which are valueless on the prairie, although isolated instances occur where individual trees of these varieties, from some local cause, have done well.

The Messrs. Curtis, of Paris, Edgar County; L. Ellsworth & Co., of Naperville, Du Page County, and other Western nurserymen, furnished more or less trees. To their credit be it said, more of them are better adapted to our climate and soil than those brought from the East. I suspect this to be more the result of accident than design, for fifteen or twenty years ago the subject of what varieties were best adapted to the West was but little understood, owing to the limited experience of the orchardists in the West. Now the thing is different, and there is no valid excuse for a man to plant trees that are not hardy, productive, and valuable.

In April, 1856, M. L. Dunlap established the first nursery for growing and selling trees, commencing by planting 120,000 grafts, comprising nearly 150 varieties. Owing to the extreme dryness of the season, nearly all the grafts failed to grow. Doubtless this was a blessing to the future purchasers of those trees, had they lived and grown, for in this list of varieties were nearly one hundred that are unsuitable for Western orchards; but at that time they were untried, and, therefore, it was not possible to know their value. The writer has often sold one hundred trees for an orchard, in which were from sixty to seventy varieties, the purchaser wanting as many varieties as possible. Now, the desire of most planters has been narrowed down to ten or fifteen well-known sorts, and a disposition manifested to let some one else experiment.

Mr. D., intending to make fruit-growing a part of his business, planted an orchard of fifteen hundred trees, five hundred of these being seedlings, into which it was the intention to top-graft new and untried varieties. Some of them have been grafted, others still remain. The first orchard was more an experimental one than anything else, many varieties being then planted that the proprietor would not now allow to be set on his grounds, while others, new and untried, have proved valuable.

Other nurseries soon sprung up, and tree planting was stimulated to a great extent; and had all the trees lived that have been planted in the county, we should now be supplied with an abundance of fruit; but, as

is usual (so far as my observation goes), not one in ten has ever brought forth fruit.

In the early planting of fruit trees, I have been unable to find that any pears, quinces, cherries, or plums were planted, except the common Morello cherry; but of late years they have been extensively set out. The first cherry trees sold were, of course, from Rochester, and consisted of Black Tartarian, May Duke, and others of those classes; but out of many thousands, I doubt if one tree ever bore a full crop, or else did it once, and died. The principal variety now planted is the Early May (Richmond), of which hundreds of bushels are sent to the Chicago market from this station annually.

Pear culture is yet in its infancy, but there is no good reason why it should not be as successful here as elsewhere. In the spring of 1865, the writer planted the first acre of strawberries in the county for market. The next season, Mr. G. M. Rice set out five acres, Platt, Fuller, & Earle twenty, G. D. Wicks three, and several other parties smaller quantities. From that beginning of one acre five years ago has sprung up a large trade in this fruit, several thousand bushels being shipped from the county every season.

In raising other small fruits, not much is done, although the culture of raspberries, blackberries, and grapes is extending, so that in two or three years the products from the present plantations will begin to make a perceptible impression on the markets.

In my conversations with the old settlers, I have often inquired if seedlings appear to retain their vigor longer than grafted varieties, and have been told that out of a given number of trees by far the largest number of seedlings give up the ghost first.

It also appears strange that there should not be some old pear trees, but I can not hear of one more than twenty years old.

The first May cherries, of which I have any knowledge, were planted fourteen years ago. They were on Mazzard, Mahaleb, and Morello stocks. Those on Mazzard are years since dead and forgotten; some of the Mahalebs still lead a sickly existence, while of the five original Morellos all are still alive, and bear good crops, although the annual cuttings they received in their early days when cions were scarce has sadly marred their beauty and thrifty look.

Peaches were extensively grown, while the country was new, and before railroads brought in the curculio; but the winters of 1855–6 destroyed many trees, since which time, owing to the unfavorable seasons and curculio, not enough of this fruit has been raised for home use.

WOODFORD COUNTY.

BY JOHN G. ZELLER.

Apples.—In 1824 Austin Crocker planted the first apple orchard in the river bottom on section 25, Spring Bay township.

Charles Fielder commenced planting in 1826, on section 24 of same township. Probably one-fifth of these trees are still alive and in good bearing condition.

Four years ago a tree in the Crocker orchard yielded forty-five bushels. Many of the trees were seedlings, and even the grafted fruit was rather inferior. They were brought from New York and Ohio, and were planted on the second bottom, in a rather sandy soil. A large portion of them were prostrated by a terrible gale on the 13th day of May, 1858, but most of these have continued bearing in their prostrate positions up the present time.

In 1840 Joseph Pelzley planted the first orchard on the Bluff on clay soil. The trees in this orchard were mostly grafted fruit. While the above-mentioned orchards have been badly neglected and mostly in grass, this one has been well cultivated and manured, and is in a good bearing condition, making a source of revenue to the owner. At present there are many fine orchards on the clay soil of the upland.

Grapes—In 1848 Adam Erkstien brought the first Catawba and Isabella grape layers from Cincinnati, and planted them on the steep slope of a branch of Partridge Creek. He raised a number of canes and cut them all back to two or three buds each, on what might be called the "Spur system," continuing this mode of pruning, accompanied with severe summer pruning. These vines, though still living, have never borne well, and have been affected with leaf-blight. The berries have rotted to some extent.

The soil is a black sand and gravel, well adapted to grape growing, but the situation is a bad one, being on the declivity of a narrow creek valley, where late frosts in the spring frequently destroy the tender shoots, and the heated air of damp summer days brings mildew on fruit and foliage.

Grape Rot seems to be most destructive where the vines do not have a free circulation of air—at least my own observation has proved it so. During the wet season of 1869, I lost my whole crop by rot, my vines being planted on bottom soil and sheltered by an elevation on the east and west; while in the same season some of my neighbors, only a few hundred yards distant, had a full crop, their vines being in more exposed situations, and on poorer soil.

In 1858 I planted the following, which were then new varieties here, viz: Concord, Delaware, Hartford, Virginia Seedling, and Herbemont. Of all these varieties the Concord seems to be the only remunerative one, except where the Hartford can be sold as a table grape, on account of its earliness.

Virginia Seedling is a good wine grape, but does not yield sufficiently.

Delaware suffers from leaf-blight, and is badly preyed upon by the gall louse.

Herbemont is too tender. Rogers' Hybrids, Nos. 4 and 15, I find commendable varieties.

Grape growing has lately been tried on prairie soil, and partly with good success, especially where the soil is well drained.

Pears—There are several old standard pear trees (of summer and fall varieties), in the bottoms, and some on the bluff—the oldest probably

twenty-five years old—which frequently bear large crops of fruit. Some of these trees are grafted on Hawthorn stocks, which has the effect to dwarf them.

A large number of pear trees has been planted of late years, mostly of the Madeline, Doyenne d'Ete, Bartlett, Seckel, Louise Bonne de Jersey, Flemish Beauty, Easter Beurre, Vicar of Winkfield, and Winter Nelis. Many of these trees are in bearing, and produce excellent fruit.

For my part, I can recommend the Vicar of Winkfield, Winter Nelis, and Easter Beurre, as standards, and Bartlett, and Louise Bonne de Jersey, as dwarfs. The bluffs or slopes of the river bottoms seem to be better adapted to fruit culture than the bottom itself, both for quality and quantity of the products.

Fruit culture in the county is in the ascendency; thousands of trees are annually planted.

MARION COUNTY.

BY J. S. TAYLOR.

O. B. Galusha, *Secretary Illinois State Horticultural Society:*

In response to your request to be furnished with the Horticultural History of Marion County, for publication in the Transactions of your Society, I have, as far as practicable, gathered the facts relating to such history, and herewith submit them.

Prior to the completion of the Illinois Central Railroad through the State, and the consequent opening up of a valuable fruit market, but little attention had been given to fruit culture in this county.

With a few exceptions, the seedling apple and peach and the Morello cherry were about the only fruits attempted to be cultivated.

The wild blackberry and wild plum, then as now, grew spontaneously in abundance, but were made of comparatively little use. There being no facilities for shipping, the production of fruit for market was not thought of, and not until the introduction of improved varieties of fruit, particularly of peaches, some three or four years after the completion of the railroad, did this branch of industry begin to receive much attention.

The surplus of the orchard, if sold at all, was commonly hauled to the nearest store, and there traded for store goods at from twenty-five to fifty cents per bushel, for both peaches and apples. No longer ago than 1857 and 1858, the above price was paid for the seedling fruit offered for sale to the merchants in the then infant city of Centralia. Some of this fruit was shipped to Chicago by the more enterprising purchasers, where it realized them a handsome profit, being sold at five and six dollars per bushel.

As a thought bearing upon supply and demand of fruit, it may be here stated that notwithstanding the vast increase in the production of fruit, so great indeed that we now ship a thousand boxes from this county for every one shipped at that time—the price even of the same

quality of fruit is thought small indeed, when it does not bring to the producer three times as much as then.

Of the apple orchards planted from 40 to 45 years ago with improved varieties, a few are yet in existence.

The oldest one of these, situated four miles east of Centralia, was planted 45 years ago, by Mr. C. W. Jennings, who still resides upon the place. The trees were brought from Bond county, and consisted of the following varieties, viz:

Limber Twig, Milam, Little Romanite, Pennock, and Rambo.

After coming into bearing, the orchard proved entirely satisfactory until a few years since, when either from the ravages of insects or a want of proper culture, the fruit has greatly degenerated and the trees fallen into decay.

Another of the pioneer orchards was planted about the same time, on the "H. Copple" place, three miles southeast of Centralia, by a Mrs. M. Taylor. The trees in this orchard were almost exclusively of the Pennock (Big Romanite). These two and one or two others constituted the pioneer orchards of the county, and the history of one will suffice for that of each.

The orchards planted subsequently to these and before the introduction of improved varieties consisted mainly of seedlings, with sometimes a few trees of the Big and Little Romanites and the Hoops apple.

All these earlier orchards proved entirely satisfactory to their owners, furnishing plenty of fruit for the uses of the family, with a surplus to be fed to the hogs, or traded for goods at the store. But, as we have often heard it expressed by these pioneer fruit growers, "Since the introduction of improved varieties into the county, our apples have been a failure." "The trees have become diseased, and the fruit knotty, rotten, and full of worms."

While we are very far from admitting that the multiplication of varieties has effected the change, yet we do know that the apple crop, as regards quality, is not what it was ten years ago, and from the first planting of trees up to that time. What has produced this change it is not the province of this paper to discuss, even if I had the ability or inclination to do so.

Peaches—As has been already stated, the peaches grown during those earlier days of our county were almost exclusively seedlings.

These were commonly planted in the fence corners, or out-of-the-way places, and left mainly to care for themselves. In this way an abundance of fruit was obtained for home consumption, and as this constituted its principal value, nothing further was sought after.

Some of these seedlings were of excellent quality, and I have no doubt a list of good varieties might have been made out of the seedlings originating in this and the adjoining counties. No attempts were made, however, to disseminate them, and their virtues have remained unknown, except in the neighborhoods where they originated.

An exception to this may be found in the case of one variety, that of the Alman Cling.

This peach has been propagated and extensively distributed by Mr. B. Pullen, of Centralia.

Its history dates its origin, in this county about the year 1828, on the Thomas Alman place, five miles north of Salem. About 1832, D. W. Alman (son of Thomas) planted quite an orchard of trees propagated from the original seedling.

This orchard proved valuable, its fruit being much sought after. It came into bearing about 1835, and continued to bear profitable crops until about 1860, when it began to fall into decay. A few of these decaying trees yet remain, and bore fruit in 1870 at thirty-five years old.

A NEW ERA.

With the completion of the Illinois Central Railroad, dates a new era in the history of Horticulture in Marion County, as, indeed, in all the southern part of the State, since it afforded an easy and rapid transportation of fruit to a good market.

The geographical location of the county afforded a season and climate wherein could be produced fruits and vegetables far in advance of the colder and more backward North. These advantages attracted the attention of many fruit growers elsewhere, who sought here new homes and a new field wherein to follow their avocation. They came bringing with them varieties of fruit, as well as ideas of culture, entirely new to the older settlers.

They planted these improved varieties, and practiced improved modes of culture with such success that others were induced to follow their examples. Thus were laid the foundations of a business, which in a brief period widened and increased in importance until the income derived from it is annually counted by hundreds of thousands of dollars.

Among the pioneers in this enterprize, in Marion County, may be mentioned the names of A. P. Crosby, M. Frazer, and B. Pullen, of Centralia; John Martin, of Alma, Thomas Ray, of Tonti, and Isaac Heaton, of Kinmundy.

To Mr. Crosby belongs the credit of planting the first general variety of improved fruits near Centralia, and, so far as I can learn, in the county. He began in 1853 setting peach, apple, pear, cherry, and some of small fruits. The apple orchard set at that time contained Red June, Summer Queen, Franklin Pippin, White Bellflower (or Ortley), Little Romanite (Gilpin), and Rawles' Janet.

The orchard is in healthy condition, and, with the exception of Franklin Pippin, the varieties have proved satisfactory.

COMMERCIAL PEACH ORCHARDS.

The peach orchard, planted at that time, came into bearing in 1856; the fruit, being the first production of improved varieties (except the "Alman"), within the county, sold at fair prices. This orchard proved profitable up to 1864, when the unprecedented freeze of that winter nearly destroyed it.

In 1857, Mr. B. Pullen set the first large peach orchard ever planted in the county; setting, in that and the following year, 5,000 trees.

In 1858, Isaac Heaton, Thomas Ray, and John Martin, planted orchards of from 500 to 1,500 trees each. Mr. Crosby also planted an extensive orchard the same year. These orchards have all proved more or less valuable, but like Mr. Crosby's original orchard, and indeed all the peach orchards in the county at that time, were seriously damaged by the frost of 1864.

To these men belong much of the credit for the reputation which Marion County has acquired for fruit-growing. It is no disparagement to others, but a simple act of justice to say that to Mr. B. Pullen, of Centralia, more than to any other one man, is this credit due. Making peach culture—both of trees and fruit—a speciality, he has, during the thirteen years that have passed since he began the work, labored with untiring faithfulness to widen and extend the influences of his chosen avocation. The success of peach culture naturally led to the extensive planting of other fruits.

The pear began to be planted in about 1860, but the tendency to blight in the trees has greatly retarded the extension of its culture.

Grapes—In 1860, Mr. V. Betz, and in the following year his brother, John Betz, planted vineyards of Catawba and Isabella which proved nearly failures.

Subsequent plantings of Concord and Hartford Prolific, and to some extent, Delaware, have proved more successful.

One or two vineyards in the county, particularly that of Mr. A. Blum, at Centralia, have been reasonably successful. This vineyard was planted in 1865 on prairie soil, trenched (inverted) two feet deep, but not under-drained. The vines were set four feet apart each way, and trained to wire trellises. It has produced two large crops of fine fruit in the three years since it came into bearing. Successful grape culture in this section, however, may be set down as yet doubtful.

Strawberries—The cultivation of the strawberry began in 1864, by Messrs. Sims and Wilson, at Centralia, who that year planted thirteen acres. Since that time its production has increased rapidly until it now ranks second in importance among the fruit crops of the county.

Within the past six or seven years the gathering of the wild blackberry and shipping to northen markets has become an extensive business, and is rapidly increasing. The superior character of the Lawton and other improved varieties is beginning to attract attention, and their cultivation is increasing.

The Raspberry and other small fruits are also beginning to receive attention.

BOND COUNTY.

BY HENRY W. WAIT.

In answer to your interrogatories, I will say that the first orchard of any extent in Bond County was planted in 1820, by John Smith, commonly called Apple John, and is situated about three miles southwest of

Greenville. Mr. Smith came to this county in 1818, bringing cions with him, and started a nursery; from which a large part of the trees set out in this county, in its early settlement, were obtained. Mr. S. planted 600 trees in 1820 and added thereto until he had one of the largest orchards in the State. This orchard, like many of those first planted, is now in a dilapidated condition. The severe winter of 1855 and 1856 made sad havoc with the trees.

Mr. James Smith, a brother of John and next neighbor to him, planted out an orchard at about the same time, though of less extent. Of the other large (old) orchards, the most prominent were those of Benj. Johnson, near Pocahontas; Benj. Allen, in the south part of the county, and that of Wm. S. Wait, near Greenville. Of large orchards of later date might be mentioned those of Wilson Leaverton, James S. Johnston, E. Gaskins, and others. Almost every farm of any age has its apple orchard, and "Old Bond" has always stood No. 1, both in quantity and quality for apples. We believe that when reasonable cultivation is given, we can and do raise as fine fruit here as can be produced anywhere.

The leading varieties in the old orchards are the Yellow June, Red June, Queen, Rambo, Pennsylvania Redstreak, Milam, Pryor's Red, Newtown Pippin, Big Romanite, Little Romanite, "Jenneting."

The most profitable of these have been the Jenneting (Rawles' Janet), Big Romanite (Pennock), Rambo, Pryor's Red, Little Romanite (Gilpin), and Newtown Pippin. I have endeavored to mention these in their proper order as regards *profit*, taking into consideration longevity, health, and productiveness of the trees, salableness of fruit, etc.

Of later planted varieties (for profit), and superior to some of the foregoing, are the Ben Davis, Winesap, Rome Beauty, Smith's Cider, etc.

Summer apples, with us, have seldom sold at remunerating prices. The Yellow Bellflower, Northern Spy, and some other fine varieties, have proved shy bearers. The apple crop of 1870 is quite light.

But little attention has been paid to pear culture. Peaches of the finest quality are raised in abundance for home use, but are not a sure crop. There have been few peach orchards planted in this county for market purposes.

Grapes, strawberries, and the small fruits generally, all do exceedingly well here, though they have not been cultivated to any great extent, except for family use. Until the last two years we have had poor facilities for marketing, but since the completion of the St. L., V. and T. H. Railroad through the center of our county, the small fruits are looking up.

Ornamental Horticulture is not so far advanced as could be wished, though we compare favorably with our neighboring counties.

There is now no nursery in Bond County, which is a great drawback to the horticultural art.

GRUNDY COUNTY.

BY O. B. GALUSHA.

"Little Grundy" has a brief, and not highly interesting horticultural history. Yet, as important hints are often taken from the observations

of little things, I hope some benefit may be derived from a consideration of what has been done here. This county is divided by the Illinois river, which runs through it from east to west, near its north side, cutting off one entire tier of townships and about a third of the second. The slope, and there is but little upon either side, is toward the river. The Mazon Creek, of national fame, for furnishing from its bed and banks beautiful and rare fossils of plants and animals, of the "coal period," drains a portion of the east side, south of the river. There are several other streams emptying into the Illinois that drain portions of the county. These streams are skirted with timber, and the lands adjoining are somewhat undulating, but the general surface of the county is nearly level, and of rich, prairie formation.

In these belts and groves the oldest orchards of apple trees were planted. The first of these was planted by William Hoge, in Nettle Creek township, north of the river, in the year 1832. This orchard is sheltered by dense timber on the north, west, and east sides. The soil is a rich, black loam, with a clay sub-soil.

The varieties planted were Early Harvest, Carolina Red June, Rambo, Roman Stem, White Winter Pearmain, Milam, Domine, Golden Russet, Vandevere, Rhode Island Greening, Rawles' Janet, Green Newtown Pippin, Talman's Sweet, and a few others. These varieties proved profitable up to the winter of 1855 and 1856, in about the following order: Rawles' Janet, Domine, Carolina June, Rambo, Roman Stem, Golden Russet, White Winter Pearmain, Milam. The remaining varieties did not prove uniformly productive. A part of this orchard was root-grafted and a part stock-grafted, but no difference has been observable on this account. When the writer first visited this orchard, about twenty years ago, the proprietor showed him two trees of the Green Newtown Pippin standing side by side, which had, as he said, never paid for the ground on which they stood. He was then advised to dig up the sod under and around one of the trees (every body in those days seeded down their orchards after two or three years' cultivation), and apply a liberal dressing of leached ashes, of which he had a ton or more. He did so, and the next year was rewarded by as large a crop of exceedingly fine fruit as has ever been seen of this variety in the West. The other tree remained unfruitful. "The winter of 1855 and 1856 was particularly severe upon this orchard," as well as upon one near it belonging to a brother of Mr. H., Hon. Samuel Hoge, killing many of the trees outright, and damaging others so sadly that they have been dying from year to year ever since. Had the owners at once broken up the ground in their orchards, scraped, washed, pruned, and manured the trees, doubtless they would have saved many more of them.

In 1835 Jacob Claypool planted an orchard in the timber land on Waupacan creek, south of the river. The soil is a deep, porous clay, with sand about eight feet below the surface. The varieties planted were Rawles' Janet, Yellow and White Bellflowers, Little Romanite, Rhode Island Greening, Sweet Vandevere, and several others unknown. The trees all thrived, and, with the exception of Yellow Bellflower and

Rhode Island Greening, bore well for twenty years from setting, or until the winter of 1855–6, which killed many and injured all the trees except the Sweet Vandevere, which has shown no signs of injury. This is regarded as the best winter sweet apple, by those who have it in bearing. The ground on which this orchard stands *has never been plowed.* Hogs have been pastured in it from the first. The fruit has been fair and fine until two years since, when it became wormy. The codling moths, of which the worms are larvæ, doubtless came from an orchard near this, on the west, which then came into bearing and was infested with them.

Seedling peach trees were interspersed with the apple trees in this orchard, and prospered well, continuing to bear good crops once in two or three years, until the hard winter which destroyed all the peach trees in the county. Mr. C. planted an orchard of seedling apples in 1839, which has given good results. This also has been used as a pasture for swine. Both these orchards are surrounded by a grove of thin timber. Jesse Newport and A. K. Owens planted orchards at the same time as Mr. C.'s first orchard (1835), and from same lot of trees. They were root-grafted trees, brought from Belmont county, Ohio.

Mr. Newport's orchard is on Mazon Creek—"bottom land"—a clay loam. His success has been about the same as that of Mr. C. Mr. Owens' orchard is on hazel barrens, with a sandy loam soil (also protected by timber). This orchard suffered less from the effects of the hard winter than either of the others mentioned.

There were many other orchards planted soon after these, but the history of the majority of them would be a repetition of what is written of these.

The orchard which I planted on the prairie upon the north line of the county, in 1850 and 1851, consisted of sixty varieties of apples, such as were then reputed to succeed well, or promise well, in this part of the State.

For a list of the leading sorts that proved profitable, I refer the reader to my report "Ad-Interim" published in this volume. I will add to that list, however, a few that succeeded well in my orchard and in others where I have seen them in the county, viz: Hubbardston's Nonsuch, Michael Henry Pippin, Golden Greening, May (of Myers) Hocking, Black Apple, (Hodge's) Autumn Sweet—an upright growing tree, good bearer of fair, medium fruit; Milam—poor apple, but "bears well, keeps well, and sells well;" Pomme Grise—good for dessert, but too small to sell; and Montreal Beauty Crab.

This orchard suffered less from effects of the terrible winter of 1855-6 than any one that I know. The trees are nearly all "low-headed trees, branching from two to three feet from the ground. They have never been pruned, except to cut away sprouts from the bases of the trunks, and remove those branches which crossed or chafed each other. It was cultivated up to the time of the hard winter, after which the land was manured upon the surface, and the entire surface covered with old straw to the depth of six inches. This heavy mulching was partially renewed the succeeding spring, and turned over to keep down the weeds. *This*

orchard has never ceased to be productive (except the Yellow Bellflower and Northern Spy varieties—the latter has lately commenced, and now bears fair crops annually). It is partially sheltered by an artificial grove and another orchard on the west and northwest on higher ground and about twenty rods distant. The soil is ordinary prairie soil, with a stratum of sand and gravel about five feet below the surface. The remarks in my report upon apple orchards will apply to the orchards generally throughout this county.

Some persons who have planted orchards upon flat lands, without ridging it for the trees, are complaining that "it is not a good country for fruit."

The orchard described in the "Ad-Interim" report, as being the most profitable one seen this year, belongs to Wm. Reardon of this county, and is situated four miles west of Morris, on the north side of the river. It is in this orchard that the trees producing the new or unknown apples which I described at the meeting of 1869 stands, and from which cions were distributed to members of the Society, both at that meeting and the one of 1870. As the fruit could not be kept for exhibition at the winter meeting, I give a description of it:

Fruit medium to quite large; color light yellow ground, mostly overspread with stripes and plashes of light and dark red; form round, slightly irregular or ribbed, smaller at the stem end; basin rather wide, somewhat furrowed; calyx closed; stem long, slender, in a narrow, deep cavity; flesh tender, crisp, juicy, with a mild, pleasant, sub-acid flavor; quality good; season middle of September through October, succeeding the Lowell.

Mr. R. says: "I eat no other apples, while these are in season." From my own knowledge of this apple—having used it last year for cooking—I think it a very valuable acquisition, and, perhaps, taking into account the remarkable and constant productiveness of the tree, the very best of its season. I have christened it *Fall King.*

Two valuable seedling apples found in this county were exhibited by me at the meeting, and cions distributed. Both these give promise of taking rank among our best.

Pears.—Standard pears upon the sandy soil near the river have succeeded tolerably well. Trees of Bartlett, Flemish Beauty, White Doyenne, Louise Bonne de Jersey, and perhaps others have been bearing in one of the gardens in Morris for six or eight years, and show little signs of blight. Those on quince are not adapted to sandy soils, but succeed well on the prairie in this county, until attacked by the blight, as the most of them are, before they have borne their third crop. Good culture without the use of stimulating manures has generally proved better for dwarf trees than neglect or grass.

The dwarf pear orchard of E. Sanford, of Morris, on a black prairie soil, has been manured with liberal dressings of lime and also of stable manure, the earth being plowed up to the trees, until the surface along the rows is two feet higher than midway between the rows. The orchard is also under-drained with tile. The trees are thrifty, with very

little indications of blight, and the fruit is remarkably large and fair. This orchard was deeply trenched before the trees were planted.

Grapes.—On the south bank of the river is a strip of sandy loam, varying from a quarter of a mile to a mile in width, and elevated twenty to fifty feet from the bottom lands, upon which grapes succeed admirably. The fruit contains more saccharine than that grown upon prairie soil, or even the true "Loess" of the higher bluffs. There is a less luxuriant growth of vine, but both wood and fruit ripen early and fully. The Concord vineyard of Henry Clapp, two and a half miles southeast of Morris, upon sandy land, was visited by the Committee Ad-Interim just before the ripening of the fruit this year, and they pronounced it unsurpassed by any they had seen in the State, both in respect to the healthy luxuriance of the foliage and the clusters of fruit. (The Committee had not then seen the vineyard of Mr. A. Adams, of Rome, Peoria County, planted also upon the same sandy formation, near the Illinois river, which even surpassed that of Mr. C.)

The vineyard of Mr. E. Sanford, Esq., of Morris, contains twenty or more varieties. The soil and cultivation same as in his pear orchard. He has realized fine crops for several successive years, but the foliage is not as perfect or the fruit quite as sweet as that upon lighter soil. I think I have never seen, however, more weight of fruit, in proportion to size of vine, than that upon the Concords, Hartfords, Isabellas, Delawares, and several of Rogers' Hybrids in this vineyard.

Plums here, as elsewhere, are a prey to the curculio. One orchard, however, planted on rich timber land, very near the house of the owner, and where a large number of domestic fowls scratch and wallow, produced, this year, a large crop of exceedingly fine fruit.

Cherries—Early Richmond alone, has been planted to any extent. This flourishes everywhere. The English Morello is *now* being planted for canning, etc. Of course this will do well—for it always does wherever planted.

Peaches—Few peach trees have been planted since the hard winter. I think nearly every tree there is in the county bore this year. Previous to 1856 good crops were realized once in three or four years.

Of *Blackberries*, the Kittatinny alone repays. This is hardy and a good bearer of good fruit. I have plowed up my Lawtons, "Missouri Mammoths," and Wilson's Early.

Raspberries—The following are cultivated and *valued* in about the order named: Mammoth Cluster (same as "McCormick," Collinsville, Miami, and Large Miami), Philadelphia, Clark, Miami, Doolittle, Purple Cane, Davison's Thornless.

Among *Strawberries*, Wilson's Albany here, as throughout the State, takes the lead. French's Seedling, Russell, and Green Prolific are profitable; especially French's Seedling for family use—too soft for market.

Gooseberries—White Smith succeeds admirably in some of the gardens in Morris. Houghton's, of course, is the prominent variety, and

always pays two hundred per cent. on the cost of production for use in the family. American Seedling or Pale Red is very productive, but not valued on account of its smaller size and tougher skin.

Currants continue to be healthy and productive, the currant worm not having, as yet, made his appearance in the county. The best crops are obtained by manuring and heavily mulching.

Market Gardening—Very little has been done in this county in market gardening, owing to the limited home market and the distance—60 miles—from Chicago. It is doubtful, however, if there is any soil in the State in which garden roots and vines flourish better than on the sandy loam referred to.

TIMBER PLANTING.

The sentiment prevails over the county that groves and belts of timber are almost a necessity, for the protection of orchards, as well as to promote the comfort of man and his domestic animals.

Some good examples are found here, in the good work of tree-planting. One man has over a mile in length of evergreen trees planted, and a quarter of a mile of double rows of maples. Another has ten acres planted to trees; another eight, and thus I trust the work will go on until the influence of these groves and lines of trees is felt all over the wide prairie which constitutes four-fifths of the area of the county.

CARROLL COUNTY.

BY J. HALLET.

It has proved very difficult to obtain correct information concerning fruit culture in the early history of Carroll county. It is, however, a fact that nearly all the oldest apple orchards were planted with seedling trees. I have an orchard that was planted in 1842, by David Emmert, on high, brush land, with clay sub-soil. This orchard (of the original trees), is now in good health, and bearing regularly. Varieties—White Winter Pearmain, Smith Cider, Maiden's Blush, Carolina Red June, and Red Stripe. The Yellow Bellflower, same age, large and thrifty—apples few, if any.

In later planted orchards, the following have become great favorites:

Summer—Red Stripe, Trenton Early, Early Pennock, Red Astrachan.

Fall—Fameuse, Maiden's Blush, Fall Winesap, Rambo.

Winter—Willow Twig, Ben Davis, Domine, Little Red Romanite.

The oldest orchards were seriously injured, I think, in 1858, by sunscald on the southwest side of largest trees, and of the best and most tender varieties. This, with the ravages of the bark louse, destroyed about one-half of the trees, more especially those trained with high tops, thus exposing the body of the tree to the sun.

This fact caused the adoption of the plan of "low heading" young orchards quite extensively. This method being somewhat contrary to

nature,* and also a great obstruction to cultivation, renders the system very objectionable, and the opinion is becoming quite general that low-headed apple trees are not so productive. Experiments have proved that old apple trees, nearly destroyed by bark lice and neglect, can be entirely renovated and made productive bearers by the following treatment: Prune severely; a thorough mulching; old bark scraped off to the quick, and a wash applied in June to the bodies of the trees, composed of one pound rock potash dissolved in three quarts of water. I have trees that were planted in 1842 and in 1848, to which the above treatment was applied, which required three years' time cutting away, about one-third of the old tops each year, thus producing an entire new top selected from the suckers or water sprouts which naturally appear among the branches of an old decayed tree. These new branches began bearing in about four years, and now the entire tree has as fine an appearance, and is as good a bearer as if it were only one-half its honest age.

I have received the following letter, which I insert:

ELKHORN GROVE, November, 1870.

JAMES HALLET, ESQ.:

Dear Sir:—In regard to the oldest orchards in this vicinity, I believe that Sample M. Journey was about the first to plant trees in or about the Grove in the year 1837. There might have been other orchards planted there about the same time; am not certain. My own orchard was started in 1840, when I planted one hundred trees, and afterwards as fast as I could get them, till I had planted four hundred trees; and for best winter varieties I don't think I had anything above the medium kinds, as I bought such as were offered for sale, good or bad. Of such as I have, the Pennock has proved hardy and a good bearer; also, Rawles' Janet, White or Green Pippin, Romanite, Milam, White Winter Pearmain, and Roman Stem. The Yellow Bellflower has proved a poor bearer; never has paid for the ground it has occupied. The Golden Pippin has proved hardy and a good bearer, but I am not sure as I have the true name.

Yours truly, H. SMITH.

Henry Smith's farm lies on the north side of Elkhorn Grove, in the southeast corner of Carroll county; soil high rolling prairie. His orchard has been well cared for; is quite productive, and is, at present, considering its age, in good condition. The other orchard referred to by Mr. Smith as having been planted by Sample M. Journey, is in location, soil, etc.,

* NOTE.—"Nature" always "protects" the trunks of trees. When she plants them *singly* she protects by forming side branches; when in *groups* or *groves* the side branches gradually decay and drop off—from the ground upward—when not needed for the purpose of protecting the individual tree, since the branches of each protect the bodies of others, and the height to which they are thus "naturally" pruned is in direct proportion (in any given variety), to the closeness of the planting. Hence, if we follow "Nature," in this respect, we must either allow the side branches (laterals), to grow naturally on our fruit trees, to protect their trunks from the full force of the sun's rays, or we must plant our trees so closely in the orchard that they will naturally and voluntarily cast off their side branches, growing into groves of tall trees, each one of which forms a sun-shade for the trunks of its neighbors. In this case what would our fruit be worth if we could get it? but—

"This is an art
Which does mend Nature—change it rather; but
The art itself is nature."

But in "changing Nature" we cannot go diametrically counter to her laws with impunity; and if we expose the bodies of our trees to the sun *before the bark becomes thick enough to protect the delicate alburnum* from the sudden effect of its rays, we do so at the peril of the health and longevity of our trees.—*Secretary.*

very much the same as Mr. Smith's. This farm passed into the hands of R. & H. Wilson, in the year 1849. Mr. Wilson informs me that the orchard trees proved to be mostly seedlings, but have borne well and have proved hardy, and some of the fruit from the seedling stock is very good. None of the choice varieties have proved so hardy and productive as the Willow Twig.

JACKSON COUNTY.

BY J. S. HARTMAN.

PHYSICAL FEATURES.

This county presents a greater diversity of surface and soil than, perhaps, any other in the State. Its southern boundary runs through the sandstone plateaux of the Grand Chain or Fruit Belt, so called from their elevation into high, breezy hills, that overlook the valley of the Big Muddy on the north, and the lower limestone levels towards Cairo on the south; and from the warm, rarified air that surrounds their summits during the spring and summer months. The latter fact has rendered these high plateau much sought for as favorable localities for such fruits as are liable to injury from the early spring frosts that prevail on the lower levels. The mud-lime drift of the Big Muddy River which runs through the center of the county, and the broad bottoms of the Mississippi on the west, with the fine yellow loams of the Alpine summits on the south, present a variety of scenery, soil, and productions. The coal formation here finds its southern limit, and ends in broken, detatched strata among the hills. To show the surface elevations, as compared with other parts of the State, we adduce the following figures from the engineer's survey of the road-bed of the Illinois Central Railroad: From low water mark in the Ohio at Cairo, the natural elevation of Drury Summit, or the "Makand Hill," as the railroad men term it, on the southern boundary of this county, is 333 feet; De Soto, in the valley of the Big Muddy, 115 feet. The road-bed then rises gradually, culminating at Monee, 522 feet, and finally descends to Chicago 300 feet above low water at Cairo. So it will be seen that the first-mentioned point is the highest south of Monee, and 33 feet higher than the city of Chicago.

FRUIT GROWING.

Until the advent of the Central Railroad, little was known of the capabilities of this section for fruit growing. But since then, with an abundant market opened to all points, this industry has been pushed with the characteristic energy of Americans, until the fruit interest here is the prevailing one among the people living near the stations. Apples, peaches, pears, cherries, grapes, strawberries, raspberries, and blackberries, all flourish with astonishing perfection. The amount of fruit shipped to the Chicago market alone, is something wonderful. The strawberry train began running this year, 1870, on the 23d of May, and ran till the 9th of June, during which time Chicago received 84 cars, with an aggregate of 992,601 lbs. of strawberries. The peach train ran,

from July 28th to Sept. 12th, 350 cars, and transported 4,433,289 lbs. of peaches. A few unreported trains ran after this, making, it is estimated, by both trains, an aggregate of about 6,000,000 lbs. These figures are certainly flattering; but, with the fruits sent to other markets direct, the amount could not have been less than 10,000,000 lbs. All this with but a partial peach crop. The untimely storm about Easter, which killed the entire peach crop south of Du Quoin, was a sad blow for the Grand Chain, where the greatest number of orchards are planted. Had there been a full crop, Egypt alone would have deluged the entire Northwest with peaches.

Not only in the above fruits does Jackson County abound, but in the apple, and more especially in the grape, does she find her highest capabilities. In the vicinity of Makanda, the vine has found its highest perfection. On the table lands the grape is very sound and healthy. About 500 acres of vineyard are now planted. But a small portion of the fruit is converted into wine, the largest share being marketed for table use.

VARIETIES.

Peaches—Hale's Early (rots), Large Early York, Cole's Early Red, Early Ann (wormy), Early Crawford (shy), Early Tillotson, Yellow Alberge, Heath Free, Coolidge's Favorite, George the Fourth, Jacques' Rare-ripe, Oldmixon, Royal Kensington, Ward's Late, President, Stump the World, and various others.

Apples—Early Harvest, Red June, American Summer Pearmain, Buckingham, Horse Apple, White Winter Pearmain, Winesap, Romanite, Nickajack, Pryor's Red, May, Stark, Lawver, and other southern sorts. All the standard northern varieties for winter, here become fall apples, owing to the long, warm season.

Pears—Since the last reports on this fruit, which is not extensively grown in this county, many varieties, which had hitherto found favor, have been entirely discarded. With but a very few exceptions, the American varieties are relied upon, as most of the foreign sorts persist in shedding their leaves, even when grown on the best of soils. Bartlett, Belle Lucrative, Dearborn's Seedling, Howell, Lawrence, Onondaga, Sheldon, Steven's Genessee, etc., are relied upon.

Grapes—The Concord still holds pre-eminence. Under our hot suns and breezy skies, this popular variety attains a perfection found nowhere north of 37 degrees, 30 minutes. Hartford is profitable; Delaware, sheds; Martha, good—rots a little; Iona, worthless; Eumelan, not fairly tested; Diana, good.

For wine, the chief varieties are, first—Norton's Virginia, hardy as an oak and never rots; Small Black, late—holds foliage till frost—rampant grower; Cynthiana, similar; Ives' Seedling, fine, and tolerably free from disease; Herbemont and Delaware, when grown in favored spots, do fairly and make a high-priced wine. "Sparkling Ruby," from the Concord, has lately been introduced, and is meeting much favor.

Strawberries—Wilson, only.

Raspberries—Mammoth Cluster or McCormick and Doolittle.

Blackberries—Wilson's Early and Lawton.

STARK COUNTY.

BY W. H. BUTLER.

In things material, since the advent of the pioneer and early settlers, Stark County, I may say with truth, has made wonderful progress.

Comparing what it was in 1836, when it was a wilderness of beautiful, undulating prairie, with what is seen to-day, and considering that all these changes have been wrought in so short a period of time, with comparatively little capital, without a railroad (until within a year), and being remote from markets, one might almost imagine that a race of Titans had been at work, instead of common mortals—for there is scarcely a quarter section in the county but what has been reclaimed from a state of nature and made a farm, with all the appurtenances of a home.

But here, as almost everywhere in the West, fruit raising has been much neglected, the early settlers having turned their attention—necessarily, perhaps—more particularly to substantials, while they have, in a great measure, neglected the luxuries, and not until recently—though there are many good orchards in the county—has their attention been turned so much to fruit raising as a specialty.

Within the past few years a general activity has been awakened upon this subject, and such has been the demand for trees and plants of all kinds of fruits, as well as trees and shrubbery for ornamental purposes, that the supply has not been equal to it. Large sums, in the aggregate, have been expended, not only for trees, but for grafts and grafting, to improve the seedlings and those varieties which have proved to be poor bearers, or not adapted to our soil and climate.

The kinds of fruit trees mostly—I may say generally—set out by the early settlers were seedlings, obtained principally, I believe, from Mr. Hodgson, an old pioneer, who has long since been "gathered to his fathers;" but as soon as grafted fruit could be obtained, the seedling business came to naught, and that system was adopted which was founded upon intelligence and the practical knowledge and tests of our nurserymen, who have done so much to improve the tastes of our people, and for the advancement and progress of Horticulture generally. The results of their labors and investigations have demonstrated beyond dispute the fact, and in this their services have proved invaluable, that fruit can be raised upon the rich prairies of Illinois as easily as corn, if those who go into the business will avail themselves of the knowledge and experience of our best fruit growers, whose means of communication are the published Transactions of the State Horticultural Society.

Judging from my own observations, there will be a great demand for fruit and ornamental trees and shrubbery the coming season, and as

we have now the facilities of a railroad, the demand will be so much the greater as the means of transportation are made easier. And no report of consequence should be made, especially upon so interesting and important a subject as Horticulture, without making honorable and respectful mention of the name of Dr. ALFRED CASTLE, of Wyoming, to whose exertions the people of Stark County are indebted for a railroad. Isolated as we had been for thirty years and upwards, with no means of intercommunication but the common wagon-road, the doctor, who was a large farmer, as well as an intelligent horticulturist, for two years neglected his own private business, and directed his energies and his labors for that object, and finally convinced the high officials of the "C. B. & Q.," and what was more difficult, our own people, of the mutual benefits and advantages of a railroad, which will give a greater impetus to horticultural as well as other material interests.

As there are no nurseries in this county, and we have to depend entirely upon those that are either near or distant to supply our wants, the railroad will be felt as a great present aid to both seller and purchaser. My own experience in such matters is, in order to avoid getting into the predicament of the man whose "whole life was a failure in fruit raising," for obvious reasons, to buy from home nurseries instead of foreign.

As to the mode of culture practiced by our orchardists, there is nothing peculiar. Some attention is paid at the start, until the trees get into bearing, when the word *neglect* will apply as a rule, and care and attention the exception. There are examples of the latter, and thrift and plenty of fruit are the consequences; but many of the orchards in this county are already upon the decline; the effect of ignorance, the raids upon them of the various insect tribes, the want of proper cultivation and timely and judicious pruning, sufficient draining, etc.

It is conceded, I believe, that timber locations are better for fruit than the bleak prairies, on account of soil as well as protection; but there are good orchards upon the prairies, some of our best, and I append a list of fruits furnished me by Mr. Perry Stancliff and Mr. James M. Rogers, two among the best orchardists of the county, which those gentlemen have proved to be good varieties for this section:

SUMMER APPLES.

Early Harvest, Red June, Sweet June, Red Astrachan, Benoni.

FALL APPLES.

Fameuse, Fall Wine, Maiden's Blush, Autumn Swaar, Golden Sweet, Seek-no-further, Rambo, Bailey Sweet, Autumn Strawberry, Pennsylvania Vandevere.

WINTER APPLES.

Domine, Ben Davis, Jonathan, Rawles' Janet, Willow Twig, White Winter Pearmain, Roman Stem, Fulton, Talman Sweet, Wagoner, Northern Spy, Winesap, Canada Red.

PEARS.

White Doyenne, Louise Bonne, Flemish Beauty.

GRAPES.

Concord, Clinton, Catawba, Delaware, Hartford Prolific.

CHERRIES.

Early Richmond, or Early May.

CURRANTS.

White Grape, Red and White Dutch.

GOOSEBERRIES.

Houghton's Seedling.

RASPBERRIES.

Doolittle Black Cap.

STRAWBERRIES.

Wilson's Albany.

NOTE.—There is an apple in this county, I believe not known to nurserymen generally, and found in but few orchards, which is worthy of introduction, and recommendation for general cultivation. Its name is the "May Flower," and was raised from a seedling by the late eminent Bishop Chase, of Jubilee. It is a late summer variety, a perfect beauty, and possesses all the characteristics of a good, popular, and profitable fruit, I commend it to the attention of nurserymen, to orchardists, to the consideration of the State Horticultural Society. Information in regard to it can be obtained from Rev. Philander Chase, of Valley Township, Stark County, Ill. W. H. B.

MORGAN COUNTY.

BY H. H. MASSEY.

Horticulture, as practiced by the first settlers of Morgan County, was limited to a few seedling apple and peach trees; these few being the "stepping stones," so to speak, to the more extensive plantations of the finer kinds of grafted and budded fruit trees of the present day. John Wilson planted the first orchard of seedling apple trees set out in this county, in the spring of 1821. This orchard, and many others planted at or near the same date, are still standing; old familiar landmarks, like old sentinels, shaky, yet steady and ever ready to do their duty. For although useless as fruit bearers, except where top-grafted, their grateful shade and never failing bloom are always acceptable. The first nursery in the county, that we have any account of, was that of Dr. Langworthy, planted near the western extremity of Diamond Grove; and this only on a limited scale, for private use; although many trees were scattered from this small beginning, among the most notable of which is the orchard of Silas Massey, situated on the north side of Diamond Grove, in said county. The first nursery for commercial purposes was opened in the spring of 1825, near Jacksonville, by Mr. Timothy Chamberlain. The honor of

opening the first nursery for evergreen trees, we believe belongs to the pioneer Osage hedgeman of our State, Prof. J. B. Turner, of Jacksonville. This nursery was commenced about the year 1840.

It is to the Osage orange that Morgan county owes her glory (if she has any) as a horticultural county. About the year 1832, Prof. Turner commenced experimenting with different hedge plants for the purpose of obtaining a live fence that would effectually turn stock, and endure our dry summers. As professor in college and lecturer on common schools, his main object, at first, was educational; desiring to enable the population then almost wholly scattered on the timber borders, to concentrate, so as to form compact and available common school districts.

These experiments were conducted with much labor and care, and as the plants had, many of them, to be obtained from abroad, they were attended with no little expense. The return for this was, usually, a silly jeer, or an incredulous laugh from the passer by. Even the Osage orange for the first year or two, had the very pretty appellation of "Prof. Turner's Folly" or "Morus Multicaulis Hedge." While these experiments were progressing, Dr. Nelson called one evening to see him, and the conversation turning to the subject of hedges, the Doctor entered into it warmly, expressing similar views to his own in respect to their value and importance, and then remarked that while itinerating in the Southwest, years before, he remembered seeing a plant growing on the Osage river, called there the Osage orange, which, from its tenacity of life, and sharp thorns, he thought might answer the purpose. He gave such a description of the plant that the Professor immediately determined to send for it, and accordingly wrote to every one in the Southwest he could hear of that would be likely to give him any information about it. But as the Doctor had failed to give him the name, "Bois-d'Arc," by which it was known farther west, these inquiries were pushed for some time without any satisfactory results. Finally an answer came from a correspondent in Alabama, who sent him a few roots, which were put out and found to grow well; he now turned his attention to propagating from these with pretty good success. But with a new supply of roots, came a few seeds taken from the orange. The planting of these showed that from the seed it could be propagated with great ease and facility. Experience with the plant soon convinced him that the object of his search was now fully attained.

So the honor of first suggesting the Osage orange, as a hedge plant, unquestionably belongs to the learned Dr. Nelson, while our county may justly claim the honor of having brought it into use. In the earlier years of the eighteen hundred and fortys, Prof. Turner had a good sample of hedge, well made, which was inspected by many men of this and adjoining counties.

But thousands of circulars were printed and circulated in the State gratis, in addition to the continuous articles in the public papers by Prof. Turner, before the plant gained any considerable public confidence. The Morgan County Agricultural and Horticultural Society, established in 1850, has done much good work in promoting the interests of Horticul-

ture. But perhaps the greatest help in the cause was given by the organizing, in 1868, of the Jacksonville Horticultural Society, since which time its progress has been steady and the interest gradually increasing. The Superintendents of our State Institutions have all manifested a commendable taste and zeal in the horticultural arrangement and adornment of their respective grounds, thereby adding greatly to the credit of the State and the beauty of our city.

MONROE COUNTY.

BY CHARLES HENCKLER.

There are very few interesting points in the Horticultural record of Monroe county, and although cut off and formed of parts of the old counties of St. Clair and Randolph as early as 1816, it may be safely said that there has never been a fine orchard in the county. There are, indeed, fruit trees here of near a century's growth, but they are seedlings, and of quite inferior qualities. There are also numerous small collections of excellent improved fruit, of modern date, but nothing deserving the name of horticultural taste and improvement has ever been developed or has ever found place in the county. Our horticulturists are all amateurs, and have confined their operations within very narrow limits.

Considered with reference to fruit raising, our county may be divided into: 1st. Hickory and Black-oak ridges; 2d. The Mississippi bottom; 3d. Prairie lands; 4th. Post-oak lands; valuable, perhaps, in the order named. The hickory and black-oak ridges form two narrow meridional ridges—one near the bluffs, and the other running east of Columbia, towards and through Waterloo, which, before clearing, are covered with a growth of black-oak, white-oak, hickory, hazel, sumach, sassafras, wild-cherry, and wild-grape. The Mississippi bottom is four to six miles wide along the Mississippi river. The prairie land is much like the black-oak lands, and occupies the eastern part of the county. The post-oak and black-jack lands are scattered all through the hill part of the county.

The old seedlings are all small apples, of rather agreeable taste, generally green, or green and red, with dark blotches, having accidental, arbitrary, local, and uncertain names. After 1835 some improvement began, and Russets or "Leather-coats," Big and Little Romanites, Pippins, Bellflowers, Winesaps, Red and Yellow Junes, began to be planted. Since 1845 nearly all the varieties of any catalogue have found place in one part or another of the county. In one or two instances as many as a thousand trees were put out by a single owner; but for the most part the collections are small, hardly sufficient for home use. A little cider is made, some vinegar, and an occasional load of fruit taken to market; but very few farmers in the county have a real abundance of apples, or other fruits, for their own home use. The old orchards in the American Bottom were nearly all destroyed by the flood of 1844; some few have been set out there since, and seem to be flourishing. But the whole subject of fruit-growing is, and has long been, greatly neglected in the county, with here and there exceptions. Its unprofitableness and uncertainty are the principal causes of this, arising from the difficulty and distance of trans-

portation, and the terrible ravages of the insects and blight. We have no railroad, and it is a long way to haul fruit in wagons to St. Louis market, which is our nearest. The river transportation offers better facilities to the orchardists upon the river bottoms, and doubtless more care and culture would abate the ravages of those enemies of horticulturists throughout the county. It might be added that the leading popular varieties here are those recommended by the Illinois and Missouri State Horticultural Societies, and this is true also of all other kinds of fruit.

There are some nice small collections of pears, and they do very well in the American Bottom. There are fine, vigorous trees there, over a century old, but their fruit is inferior.

The *Bartlett* is the favorite pear here, but there are other excellent varieties common in the fruit catalogues.

The cultivation of *peaches* has proved almost a failure, and little or no attention is paid to it. The crop is uncertain, and the fruit and trees have so many enemies that the planter puts out his peach trees, not from any hope of return or profit, but from a sort of habit founded upon old recollections. The varieties planted are those usually prominent in popular catalogues.

If anything is a greater failure here than peach culture, it is that of the *plums*, owing to the ravages of that little Turk of the Crescent, the Curculio, which our people, not being Russians, have been unable to fight successfully. Even wild plums are becoming exceedingly rare.

Cherries generally do well, the principal varieties being the Morello, May Duke, Early Purple, Downer's Late Red, and Yellow Spanish. Cherry trees are not numerous, however. Very little small fruit is raised. Houghton seedling gooseberry, red, white, and black currants, red and yellow raspberries, are all occasionally seen, and do very well. Blackcap raspberry has been but little tried. Not a tithe of the small fruit necessary for home use is raised here.

Grape culture has received considerable attention, and is in quite an advanced condition. John Wiesenborn, in 1838, went to Cincinnati and brought thence a number of Isabella and Catawba vines, and set out the first vineyard in this county; and from his, the principal vineyards were planted, until 1863, at which time there were about one hundred acres in the whole county. Then a new era commenced; the Concord and other fine varieties took the place of the Catawba, which has become very uncertain in its crops and yield. Now at least two hundred acres, nearly all bearing, are scattered over the county.

In 1864 great numbers were obtained from Hermann, Mo. Many varieties have been tried here, and the best are Norton's Virginia, Concord, Ives' Seedling, Rulander, Mary Ann, Hartford Prolific, Clinton, North Carolina Seedling, Martha, Goethe, Northern Muscadine, Herbemont, Cunningham, Blood's Black, Taylor, Waterloo, and Cynthiana. The Isabella and Catawba are failing, and Canada, Delaware, Iona, Israella, and Riessling have proved almost worthless. In preparing the ground for planting, we break up deep, dig holes, and plant about twelve to fourteen inches deep, six or eight feet by eight feet apart, cultivate with

plow and hoe, use wire trellises, usually, and train to bow system. But few grapes are sent to market, and those to St. Louis. They are mostly made into wine, about forty thousand gallons having been made this season. The best wine years for quality and quantity were 1848, 1857, and 1867.

ORNAMENTAL AND TIMBER TREES.

BY SAMUEL EDWARDS.

It is gratifying to see an increasing interest manifested in the planting of forests; yet we have no reason to hope for general and extensive operations, in this important work, at all commensurate with the prospective need of our people, unless it receives the stimulus of a bounty from our State or National Government. Is it not fully as deserving this, as the growing of sugar cane, or the various manufacturing interests which receive aid to a large amount from the duties on imports?

Kansas has set us a good example in the encouragement given by her legislature, already inducing many to begin extensive plantations.

A very common error with beginners, is planting at too great distances.

From nearly thirty years' experience, the rule is now fixed, with me, at —rows four feet apart and trees two feet apart in the row, of European Larch and other varieties; planting among them White and Scotch Pines, 12 by 12 feet, for a permanent grove of evergreens.

I would plant almost any varieties of deciduous trees, except Ash-leaf-maple, Silver-leaf, and Lombardy poplars. Any of the hardy evergreens are highly valuable for a forest or grove, but the above are the most profitable to grow for lumber.

Experience fully establishes the fact that planting at about these distances is the best, cheapest, if not the *only* way to induce that upright growth, which is a prime necessity in timber culture.

The Chestnut is highly recommended by some, and it is desirable to have a few trees of this variety; but for extensive plantations it is too expensive. They grow no more rapidly than White or Burr oak, the acorns of which are easily gathered in our native groves, and the timber of these, at maturity, is more valuable.

COMMITTEE REPORT ON NEW FRUITS.

BY D. B. WIER.

As a member of this Committee, I have received but four parcels of plants or cuttings during the year, to wit: Of Stephen Underhill, Croton, N. Y., his three hybrid *Grapes*—"*Croton*," "*Senasqua*," and "*Long White*." These were very fine vines, and were planted with ordinary care, and had the treatment usually given vines. They made a remarkably strong, healthy growth, considering the intense drouth and heat of the season. But this was by no means a test season for health in the vine; yet it is to be hoped that these very fine varieties will prove adapted to our climate.

Pears—Charles Downing, of Newburgh, N. Y., has sent me cions

of twenty-eight varieties of pears. Many of these are varieties but little known, and having, in certain localities, where they had been introduced, or originated, an enviable reputation for health, vigor, and productiveness, though many of these are not first-class in fruit. Mr. Downing thought, with the writer, that if we could have healthy, vigorous trees, that would give us regular crops of good fruit, not best, that we would be better satisfied than we are now, when trying to get a few superlatively good fruits from feeble, unhealthy trees. I shall watch the fruiting of these grafts with great interest. Among them is the celebrated Japan Pear, a fruit entirely unfit for eating, but of great excellence for stewing, baking, and drying;—tree, so far, in the United States, I believe, perfectly healthy and productive.

We raise Quinces and Cranberries, and people are willing to pay large prices for them for cooking purposes alone—then why not grow pears for this purpose?

I have been noticing, for the last ten years, a pear tree growing near here. During that time it has borne enormous crops every other year, and a handsome crop in the alternate years. The tree has had no care whatever. At times it has been cultivated by growing garden truck around it; at others it has been surrounded by weeds or grass. During the whole time it has been a perfect picture of health and vigor. Not being able to recognize it in any of the books, I, this fall, sent specimens of the fruit to some of our most noted pomologists, none of whom were able to recognize it as a known variety. Charles Downing says of it: "In quality, *very good*, if not *best*." The original tree was bought as "Henry the IV," which, it is supposed, died back, and the present variety sprang from the roots. This variety may prove a grand prize to Horticulture in the West.

My attention has also been called to some wonderful pear trees, of an unknown variety, near Peoria, the largest of which is over six feet in circumference. The most wonderful stories are told of their great productiveness, health, and goodness of the fruit.

We need a great experimental orchard, located at some point where *trees will grow;* or, series of orchards, supported by the State, in which all these new fruits may be planted and tested.

Clapp's Favorite—Three years has proven that this splendid new pear has foliage which, if it does not look good, *is* good—rather better than its supposed parent, Flemish Beauty.

New Siberian Crab Apples—Of these I have a collection of seedlings, which vary more than seedlings of the common apple, both in fruit and foliage, and all, so far as can be seen, appear to be equal in hardihood. I have several varieties grown by A. R. Whitney, of Lee county, selected, while in fruit, in his orchard, all of which are valuable and interesting—one in particular shows such qualities as an eating apple as to give us hopes that we may yet get, from this hardy stock, fruit of the best quality for all purposes. We have them already as large as average Winesaps, and with varieties ranging in season from July

until March. I have particularly observed, this season, that the Codling Moth does not prey upon the Siberian Crab to near the damaging extent that it does the common apple.

Strawberries—Amongst the many new kinds brought to my notice this season, I found none thought worthy of notice except the following: Boyden's No. 30, Michigan, and Downer's Kentucky. These are all well worthy of extended trial. The Mexican Ever-bearing can now return again to Mexico, Juarez having proclaimed an amnesty. Its disseminators could be very well spared also.

Raspberries—"Baldwin's choice of the Turner Seedlings." The variety bearing this short and poetical name, I examined pretty closely, in fruit, and was very favorably impressed with it. It belongs to our Wild Red species (*Rubus strigosus.*) The fruit is very large, bright red, and very firm for fruit of this species, appears very productive, and is of undoubted hardihood.

This is the only new variety seen of any merit.

The variety sent out by Purdy and Johnson as "Mammoth Cluster," proves, in every instance—and I have seen it in a score of places—to be exactly the same as the true Large Miami, or McCormick.

I do hope the friends of Horticulture will persist in planting seeds of the Raspberry. The Black-cap (*R. occidentalis*), family is the one for the West. We ought to tame down that rank, wild flavor, and put more flesh on its bones (seeds).

Grapes—Besides the Underhill Seedlings, before spoken of, I have seen, of the newer varieties—

Una—This has a very foxy appearing vine, but perfectly healthy—not in fruit.

Walter—Unhealthy in vine and fruit, and vine badly milldewed.

Eumelan—Same as last.

Cynthiana—Healthy in fruit and vine, quite productive—well worthy the attention of the wine-grower South.

Rodger's Hybrids—All large and beautiful in fruit, but vine and fruit unhealthy. If the use of sulphur will cure the diseases of these vines, they should certainly be quite extensively planted. The fruit is so large and fine, keeps so well into winter, that the extra labor required would be amply repaid. The same may be said of the

Iona—A fruit of great beauty and excellence, if we can get it.

Aletha—I have before given it as my judgment that this is the same as the Hartford Prolific. If I was mistaken I had good reason to be, as my comparisons were most careful. If it is not, and will continue to ripen ten days before the Hartford, it will prove quite an acquisition, as an early market grape, and to those who live so far North that later varieties will not mature.

Martha—One would suppose, by the way that this grape has been pushed and praised by its disseminators, and prominent pomologists, that if one *had Martha* he would be supremely happy. Now I have grown

Martha, seen Martha, and tasted Martha, and this close personal inspection did not result in a very deep falling in love with her. The young lady produced very grave suspicions in my mind, by the very strong smell of *musk* about her person. That highly praised, fair complexion of hers was found spotted and blotched with foul disease. Seriously I have not seen a person in this State, who has grown and fruited this grape, who does not denounce it in the strongest terms. But opinions drawn from the quality of the fruit this season, can scarcely be just, for the reason that all grapes of its family (*V. Labrusca*), were more *foxy* than usual. The vine has not done well with me, and I have heard complaints from others. As healthy and productive a vine as I have seen this season, was a vine of that notoriously unhealthy thing, *Allen's Hybrid.* This was trained on a *high arbor*, *ten feet high*, and I was informed by its owner, that this was not an exceptional year; that it had been healthy. I name this to induce persons to experiment more in the manner of growing vines. I also saw a vine covering at least five thousand square feet, clambering over trees of many varieties, the vine bearing hundreds of pounds of healthy fruit.

Blackberries—A new *thornless* variety fruited on my grounds this year, quite late; fruit, medium; plum shaped; of good quality and productiveness; bush dwarf; a nice little thing.

Needham's White and Crystal White; very pretty and very good. Fruit small; valuable as curiosities.

Wilson's Early; though I have had it old enough to bear some time, it gave, this year, its first small crop of very large and very poor fruit.

Plums—I have had for the first time, this year, fruit of the celebrated Townsend, Miner, or Hinkley Plum, and find it a very much better fruit than I had anticipated. There is no doubt in my mind but what this, and others of the same family (*Prunus chicasa*), will eventually take a high position among the standard fruits of the country. I had thought that the Miner and the Wild Goose Plum of Kentucky and Tennessee, were one and the same thing; but having last spring procured the genuine Wild Goose from an undoubted source, there was found, when growing them side by side, a very great difference in the two trees. In a letter of a late date, my friend, J. S. Downer, of Kentucky, says, in speaking of the Wild Goose: "This plum, in no instance that has come to my knowledge, has reproduced itself from seed, *and the country is almost full of spurious Wild Goose Plums.* Many nurserymen and others are now selling what they call Wild Goose plum trees on their own roots. They are mistaken, I think. All such are only off-shoots from some seedlings of the Wild Goose Plum, and not the *genuine sort.*" No man has had a better chance to obtain the facts about the matter than the veteran Downer, and there is no doubt but all the disparaging accounts published of this fruit, have been caused by parties seeing fruit from spurious trees.

Apples—Of new sorts of these I will say nothing, leaving the task to our worthy Secretary.

LOCAL HORTICULTURAL SOCIETIES.

ONARGA HORTICULTURAL SOCIETY FOR 1870.

OFFICERS:

President—E. D. Robbing.
Vice President—Horace Pinney.
Recording Secretary—J. D. Van Norman.
Corresponding Secretary—Lyman Pike.
Treasurer—H. Pinney.
Librarian—J. W. Owen.

The abundant harvests of the present year have done much to encourage us in our labors for the future, and we hope that in the years to come it may be said that we are neither dead nor sleeping.

Our crops of Blackberries, Grapes, and Apples for this year, were abundant; other fruits, for the most part, fully medium.

The fruits in the following list will be found generally profitable in our locality. Many others are doing well; some not fully tested.

Apples—Red Astrachan, Sweet June, Early Harvest, Summer Queen, Fameuse, Rambo, Yellow Bellflower, Limber Twig, Maiden's Blush, Tolman's Sweet, Domine, Milam, Seek-no-further, Vandevere Pippin, Winesap, Smoke House, Smith's Cider, Willow Twig, Wagoner.

Blackberries—Lawton.

Cherries—Early Richmond, Gov. Wood, English Morello.

Currants—Red and White Dutch, and Cherry.

Gooseberries— Houghton's Seedling.

Grapes—Concord, Clinton, Delaware, Hartford Prolific, Massasoit, Ives' Seedling.

Pears—Louise Bonne de Jersey, Bartlett, Duchesse d'Angouleme.

Besides these, there are many others that have done well, and very many others that are being tested, of which we expect to report in the future.

The vegetable crops are large, with the exception of late potatoes, which were much damaged by the Colorado Potato Bugs and dry weather.

Our Society, which has heretofore been a very good one in theory, is this year becoming a really practical one, as the large crops of fruit fully attest.

True, we have some slight discouragements; the early ripening of the apple has been followed by the rot in cases where they have not been properly cared for; the Concord Grape cracked somewhat; the birds have taken a small share (rewarding us with a song); the currant worm has been busy.

Still we have had enough, if not to fill our wallets, yet to give us

"The rosy hue of health,"

And fill us with new hopes for the future.

We have a most delightful region for small fruit-farms, which can be bought at moderate prices.

LYMAN PIKE, *Cor. Sec'y.*

FARINA AGRICULTURAL AND HORTICULTURAL SOCIETY FOR 1870.

The territory embraced within the limits of this society has been very sparsely settled, till within five or six years; the oldest *market* orchard being that of the late Wm. A Goodrich, which was planted about the year 1863. Mr. Goodrich was an enthusiastic and enterprising horticulturist, as well as farmer, and the success which attended his efforts and the efforts of a few smaller orchardists, has stimulated the business of fruit culture so that nearly all who have since opened up farms on our beautiful prairie, have planted an abundance for home consumption and generally for market purposes. Of the 25,000 or 30,000 fruit trees planted within a radius of three miles of Farina Station, about one half are peach; three-fourths of the rest are apple. Cherry, pear, and quince make out the rest of the list, in the order named.

The peach and apple crop of 1870 was quite fair in quantity, but inferior in quality; apples are not keeping well. Mr. A. S. Coon is our most successful pear culturist, and has had abundant and regular crops since his trees were large enough to bear. He cultivated pears for many years in New York State before coming here, and reports that his fruit here is much superior to that called good fruit in Central New York.

Quite an interest is also manifested in the small-fruit business. Strawberries, blackberries, raspberries, gooseberries, and currants, receive attention in about the order named. The April frost of 1870, which did so much damage in the more southern portion of the State, was not very severe here, and we had a fair crop of strawberries. For market, Wilson and Green Prolific are best; for table use, French Seedling and a variety called Pine Apple (local name), brought from Connecticut by Daniel B. Irish. The writer prefers these in a collection of over twenty sorts, with which he has been experimenting. Of blackberries, Lawton and Kittatinny are most cultivated, though there are some of many other sorts. The Lawton resists the cold better than the native wild varieties, yields abundantly, and is gaining in public opinion, as is also the Kittatinny. Large quantities of wild blackberries are shipped north from here—and years ago, this station was generally known, by expressmen and others, as "Blackberry," on account of the predominance of this fruit in its season.

Grapes do well, generally; thousands of vines are being planted, mostly Concord. Indeed nearly all the fruits suited to this latitude are at home here, and recompense the grower in proportion to the care he bestows upon them.

In times past, we have been sadly imposed upon by that *creature* "who goeth about seeking whom he may"—swindle, till most of us are shy of *traveling tree-peddlers.*

The mercury went down to 14 degrees below zero, in the cold snap in December, and nearly all the peach buds are killed. Cherries not much hurt. Our location is in the S. E. corner of Fayette county, on the Chicago branch Illinois Central Railroad, 224 miles from Chicago—141 from Cairo. Fruit nearly all sent to Chicago. Our Society now holds meetings once a month.

LIST OF OFFICERS.

President—O. B. Irish.
Vice-President—Isaac Clawson.
Recording Secretary—Wm. B. Irish.
Corresponding Secretary—E. W. Irish.
Treasurer—James Clawson.
Directors—Jno. Dunham, Albert Persels, Wm. H. Rich.

By order of the Society,

E. W. IRISH, Cor. Sec'y.

CENTRALIA FRUIT GROWERS' ASSOCIATION.

REPORTED BY THE SECRETARY.

Mr. O. B. GALUSHA, *Secretary of State Horticultural Society:*

In compliance with your request, I herewith transmit a portion of the proceedings of our local Society, whose regular meetings on the first and third Saturdays of each month are still maintained, excepting in July, August, and September, when the pressure of picking, packing, and shipping fruit, overrides everything else. Several new members have been added during the year, and one has passed over the mystic river.

MAY, 21, 1870.

* * B. Pullen, Chairman of Committee on Orchards and Fruits, reported that the prospect for an abundant crop was still good. Strawberries are beginning to be ripe, and the coming week shipping will commence. This fruit especially is needing rain, and unless it comes soon the crop will be materially shortened.

Several members reported having had ripe berries enough for home use for several days.

JUNE 18, 1870.

* * There were on exhibition fine samples of large orange-colored raspberries from the garden of Mrs. Phelps, who desired to learn the name. They were thought to be Clarke Raspberries.

There was also a box of ripe blackberries, as well as a branch, showing that it was very prolific as well as early. It is a wild variety, discovered by President Brunton, several years since, who has propagated and tested it with satisfactory results. It is no doubt a desirable acquisition, being hardy, early, and prolific. He had a few ripe berries by the 10th of June. Mr. Cooper called attention to them; had seen and tasted of the fruit before. Was satisfied that it was better and earlier than the Wilson's Early Blackberry. Moved that the Association take the liberty of naming it "Brunton's Early Prolific Blackberry," which, being submitted to the meeting by the Secretary, was carried unanimously.

SEPTEMBER 24, 1870.

J. W. Fletcher stated that our President had recently returned from a trip to Chicago and the Michigan orchards; thought that it would be interesting and instructive to hear the result of his observations. This opinion being unanimous,

President Brunton was induced to say that he had observed matters pertaining to fruit and fruit culture as closely as he knew how, and had learned a new thing or two. Supposed the permanent commission houses were conducted by fair-dealing business men. Some of them were, perhaps, rather partial to particular shippers, and would fill orders at $1.25 per box from the shipments of favorites, while the balance would only bring $1 or less per box. This would account, frequently, for the difference reported in the account of sales. Thinks the red rag, tied over the baskets of peaches from Michigan, is the main reason for their bringing a higher price than those from this locality. The peaches are no better, but they look finer through the mosquito-bar cover. In proof of this, he stated that he had watched the course of fifty boxes of Centralia fruit. Saw it sold in the morning—it remained on the sidewalk till night, when it was removed to a convenient store-room and re-packed into baskets, covered with the inevitable red rag, and placed on the sidewalk again early in the morning. Where the joke came in was, that the dealer bought them for $1 per box, which was the best price paid for box fruit, and sold them readily for $1.50 per basket, besides gaining one basket out of every twenty boxes. The peaches raised in Michigan are of no better quality than ours. The crop may be more sure, as the trees are of slower growth. Their soil is generally sandy and more easily cultivated. Berries are planted between the rows. Thought many of our peaches had been picked too early; three or four days longer on the tree would have improved the quantity as well as quality. Thought it would be policy for us to ship our best and ripest peaches in baskets—such fruit as would be consumed in Chicago. The true way is to ship in such packages that the fruit can be examined and sold by weight. The commission men of Chicago, as far as he consulted them, favored boxes for peaches from Southern Illinois.

DECEMBER 3, 1870.

President Brunton had been furnished with some books and papers

eulogizing California in general, and as a fruit-growing region in particular, with a request that he would lay them before the Association.

Mr. Reeder said that the accounts of gentlemen who went there under the auspices of the Farmers' Club, of New York, were unfavorable, so far as profit in raising fruit was concerned. Understood that pear trees were cut down, not because they could not raise pears, but because it would not pay.

Mr. Hooton said that distance lends enchantment to the view. Our pears may not be as large as those raised in California, but they are superior in quality. This was also true of apples and plums.

Mr. Pullen thought Illinois was a good State enough for him, and would not exchange this locality for any other in it. Besides being preeminently a fruit-growing region, we could raise grain with advantage. Doubted whether even stock could be grown with more profit in any part of the State. They could produce corn some cheaper in the northern part, but their longer, colder winters used it up and more to. Fruit-growing has done more to increase and build up Centralia than any other interest since the railroad was located. We have the right kind of soil for fruit, a favorable climate, good markets, and quick transportation. If any one fails of success in a series of years, it is to be attributed to careless or improper cultivation, rather than to soil or climate.

Mr. Cooper thought if any one should go from this section to California for the purpose of making more money by raising fruit, he would find he had made a mistake. A person with a taste for raising fruit is as favorably situated here as any where; had better hold steadily on; attend regularly the meetings of this Association; discuss his failures as well as successes, and not relax his energy or courage. There are difficulties to be overcome in all kinds of business. Perseverance is almost sure to be crowned with success.

The President maintained that facts were the surest test as to success in fruit raising. He was told by Mr. Kohl, a few days ago, that he had paid out over the counter of the First National Bank $200,000, in payment for fruit sold the past season. The amount received by Express and in Post Office orders probably would swell the amount to $250,000. It would be found, on observation, that nearly all shippers of fruit had been making improvements of various kinds this fall.

DECEMBER 10, 1870.

Notwithstanding the inclemency of the weather the usual number were in attendance. As most of the members of the committee on Orchards and Orchard Fruits were absent, it was deemed best to postpone definite action upon revising the Fruit List recommended by this Association. From remarks by several members it seemed to be the opinion that it would be unadvisable to change the list at present. The season has been a remarkable one. Very few apples have been raised, and no experience gained that would justify a change. The failure of the crop was attributed mainly to a late frost and the Codling Moth,

together with the alternate hot, dry, and wet weather. It was stated as a common fact that apples did not keep as well as usual this year.

THE CURCULIO

Claimed and received a good deal of attention. The result of the discussion may be summed up as follows: That it was necessary to fight the Little Turk early and often. Fall and summer plowing; plenty of hogs in the orchard; clean tillage around the trees, and the use of the curculio catcher as long as any were to be found. In fact, any and all ways to destroy the insect should be resorted to, if a fair, sound crop was expected. It was admitted that an orchard or two had yielded a fair crop the last season without the use of the catcher, but these were regarded as exceptional cases, and in these, if only a light crop had set, the curculios would have destroyed it.

The President was aware that some of the members were tired of hearing this so often repeated, but he considered it essential to impress the important fact upon the minds of all who desired to realize a profit from the cultivation of peaches; thought this locality had sustained a loss of $20,000 in the aggregate the last season by picking peaches too soon. If they had remained on the trees three to six days longer, the fruit would have been larger, finer, and consequently would have made more boxes and brought a better price.

Considerable was said in reference to the failure of the Hale's Early peach. Some attributed the decay to the attack of the curculio. This peach has a thin, smooth skin, and being early, is attractive to the rascals. Others thought the loss might be attributed to other causes. Mr. Brunton suggested that such culture as would give an excessive growth of wood was favorable to the rot in this variety. Mr. Taylor's orchard, on the best of land and highly cultivated, had a remarkable growth of wood, but the peaches rotted very badly, while the fruit of wormy trees, or those on poor soil, was generally sound.

DECEMBER 17, 1870.

Extracts from a report made to this Association by Mr. B. Pullen, from the Committee on

ORCHARDS AND ORCHARD FRUITS.

Mr. President:— * * * We take pleasure in being able to report the condition of orchards, as a general rule, good. The maturity of the immense crop of peaches the past season seems to have affected the thrift of the trees but little, and judging from appearances, we can not see but that the prospect for a crop the coming year is as good as it was for the past. We might make the single exception, that the fruit buds seem to be slightly swollen; yet it is so slight that it is difficult to determine if it be so or not.

We are inclined to the opinion, that the good condition of our orchards, after such an exhaustive season as the past, is attributable to

the superior cultivation that has been given them during the past two or three years. This is apparent on comparison, for we still have orchards amongst us that receive very little, if any, attention.

Some of your Committee are of the opinion that too much ridging in our orchards is attended with injurious results, unless the precaution is taken to keep the surface of the beds as level as possible, to prevent the water passing off too rapidly, in order that the soil may receive its due proportion of moisture. We regard this, however, as a matter for discussion, the Committee not agreeing to recommend it.

Our experience teaches us that the Early Mountain, Serrated Early York, Early Tillotson, Cole's Early Red, White Free Stone, Heath, and Hale's Early, are worthless on account of their disposition to rot, mildew, etc. They can not be recommended with safety for this section. If we permit the latter to occupy our ground, it will be more for the purpose of having a few specimens left to remind us of our folly, than with the expectation of receiving any benefit from them.

THE APPLE CROP

Was very light, and the fruit mostly destroyed by the Codling Moth. The trees are in fine condition, and promise well for another year. This being the *off* year, as politicians would say, one may expect a full crop next year. Every precaution should be taken this winter and coming spring to save the crop from destruction from this moth. Our opportunities for judging of the merits of varieties being so limited, we shall pass them by.

PEAR ORCHARDS

Generally in good condition; crop light but fruit good; more blight the past season than for the two previous years. As to varieties—were we going to plant a thousand trees—we could hardly persuade ourselves to select anything but *Bartlett*. It is an early and prolific bearer; hardy, and as free from blight as any, fine size, of good quality, and always brings the highest market price. Our conviction now is that cultivation for the standard pear should be discontinued after the trees come into bearing.

CHERRY TREES AND ORCHARDS

Also look well. The only variety cultivated, indeed, the only variety worthy to be cultivated in our locality for market purposes, being the Early May or Early Richmond. A fair crop the past season, but not so large as the year previous; yet much more profitable. The season was more favorable for this fruit, being dry, giving us better quality and condition, therefore better prices.

B. PULLEN,
M. M. HOOTON,
A. P. CROSBY,
Committee.

CENTRALIA, Ill., Dec. 31, 1870.

For ten days we have had very cold weather, with four or five inches of snow lying on the ground for a week. I have never known fair sleighing to last that length of time in this vicinity before. On the morning of the 23d, thermometers indicated from 12 to 16 degrees below zero. It is now generally understood that the peach crop for 1871 is destroyed. Although the freeze was severe, I am in hopes that there will be a sprinkling of peaches yet, from the fact that the air was dry, the ground also, and covered with a mulch of snow; besides, the wood was well matured, and the weather moderated gradually. However, the hope is neither large or strong, and is entertained under difficulties. There is some consolation in the thought that what kills the fruit will starve the curculio, and be all the better for us another season. This disaster affords another striking proof that horticulturists should adopt a mixed husbandry.

ALTON HORTICULTURAL SOCIETY.

The meetings of this Society have been held regularly during the past year—1870. They have been numerously attended, and the interest generally well sustained. The proceedings are published monthly, in pamphlet form, and the following reports and essays are selected from them:

From report of the May meeting.

REPORT OF COMMITTEE ON ORCHARD FRUITS.

On behalf of the Committee on Orchard Fruits, I respectfully submit the result of some observations of peach buds since the cold of April 15th, 16th, and 17th. Up to that time about 80 per cent. of the peach buds on my place had been killed; about 50 per cent. in February, and about 30 per cent. in March. This left enough of all varieties for a very large crop; but the cold, sleet, and snow of the dates above mentioned, have left a very few of most varieties.

I find a fair crop left, of Hale's Early, Early York (Serrate), and of seedlings, as well as of the new White Nectarine. All these are varieties with large blossoms, a fact which, after previous observation, I judge to be connected with the size of the blossoms; whether it be owing to the larger petals enclosing and better protecting the vital organs, as I am inclined to believe, or whether the large blossom is evidence of extraordinary vitality, the fact is suggestive and ought to be looked to in the selection of varieties for profitable planting.

Second in hardiness, I name Troth's Early, Red Rareripe, Magnum Bonum, Oldmixon Free, and Delaware White.

A third class includes, Columbia, Large Early York, Yellow Rareripe, Late Admirable, Health Cling, Smock, and La Grange. But in other years, Yellow Rareripe, has not, and Health Cling has been hardy.

A fourth includes Early Tillotson, White Heath Free, and Crawford's Late.

A fifth comprises Crawford's Early, and Morris' White, which are this year, with me, most tender of all.

Dr. Hull reports as follows:

Hardiest—Hale's Early, and perhaps Serrate Early York.

Second—Haine's Early, Coolidge's Favorite, Heath, Columbia, Smock.

Third—George IV, Oldmixon, La Grange, Late Red Rareripe.

Fourth—Oldmixon Cling, Barnard's Yellow, and Early Tillotson.

Fifth—Bergen's Yellow, Crawford's Early, and Crawford's Late.

Dr. Hull reports about a quarter crop of Sweet cherries, hardiest of which are Yellow Spanish, and Gridley. Next, Knight's Early Black; and third, the other varieties cultivated without much distinction. The Duke's, etc., he finds damaged about ten per cent. The hardiest are Belle Magnifique, May Duke, and Belle de Choisey. Next, English Morello, Early Richmond, and Common Morello.

Mr. Brown finds Hale's Early and Seedling Peaches hardy.

Mr. Hyde reports Hale's Early, Early York (Serrate), and Seedlings, a fair crop.

Mr. Huggins finds Heath Cling, and perhaps Hale's Early, the best of budded sorts. Seedlings all right.

Mr. Johnson finds Seedlings all right, and Hale's Early and other large blossomed varieties hardy.

Mr. McPike finds Hale's Early hardiest, and next, perhaps, Large Early York. About ten per cent. of a crop on the average.

In general, the estimates vary from twenty-five to ten per cent. of a good crop. I consider the latter the nearest right.

Apples and pears are generally believed to be unhurt, and to promise a good crop thus far.

Mr. Hilliard shows blossoms of apples injured, he thinks, by the frost of last week. Mr. Hyde reports considerable inequality of blooming on the Lawrence, some trees being in very full bloom and others quite destitute of bloom.

W. C. Flagg.

Note by the Editor.—At the June meeting, Mr. J. E. Starr read a *very able* paper on Wine; but as the views and arguments presented in it are so nearly identical with those subsequently read before the State Society and already published in this volume, it is omitted for this reason, and from want of space.

At the July meeting the topic of small fruits being called up, D. L. Hall gave his experience with

RASPBERRIES IN 1870.

I have fruited this year ten varieties of raspberries, and the following is the result of my observations:

Commencing with black caps—*Doolittle* ripened first berries June 5th; first picking for market June 11th; a good bearer and grower; of fair quality; suffered much from drouth.

Davisson's Thornless—First berries June 9th; first picking for market June 12th; fully as good as *Doolittle* in every respect, and to be preferred to it, on account of its thornless character.

Miami—First ripe June 13th; for market June 18th; berry larger and sweeter than either of the others; much stronger grower, and an enormous bearer; stood the drouth best of any berry I had.

Red Raspberries—*Clarke*: winter killed somewhat, as did all other varieties with me, owing partially, I think, to the late cultivation given them last season; ripe June 14th; good size; moderately firm, and judging from the few plants in bearing of my own, and observations of other plantations, very productive; an inveterate suckerer; quality, only second rate. I think it our best market red berry, so far.

Philadelphia—Ripe June 14th; very productive, but requires extra care and heavy manuring; quality poor and rather soft; generally hardy, but killed some the past winter.

Franconia and *Fastolf*—Both tender; quality good, but too soft, and so uncertain as to be worthless for market.

Belle de Fontenay—Ripe June 16th; in quality best; good bearer and generally hardy; requires good soil and cultivation, and heavy manuring, for the best results; but from the large size of the berries, and their handsome appearance and color, they will command a high price in any market.

Yellow Raspberries—*Golden Cap*: ripe June 10th; has winter killed two years; quality only good; poor bearer; worthless.

Brinkle's Orange—Too tender; the best of all berries where you get it; would pay to protect them for family use.

Were I to recommend raspberries for market, I should say plant, 1st, Miami, and for next best black, Davisson's Thornless; for red, Clarke and Belle de Fontenay. As our market now stands, I think quality—especially in red berries—of more consequence than firmness. With the shallow pint box, as now made, any berry, unless too ripe, can be shipped from Alton at night by express, and arrive in Chicago next morning in good condition. I would recommend for all varieties, thorough cultivation, and, if possible, mulching. For the black caps, severe pinching (in summer), both of cane and laterals, and for the red varieties increasing war on the suckers. Fortunately as yet, we have no serious disease to contend with in raspberry culture, but I am afraid of the "orange rust" of the blackberry, which can not be too carefully guarded against.

Wm. E. Smith said the drouth had cut down the raspberry crop, probably one-third; preferred the Philadelphia to the Clarke for a market berry. The quality was poor, but it is showy and sells well, winter-killed about one-fourth; Clarke, one-half; all varieties carry well in the pint boxes.

Pearson—Would you cut back Red Raspberries during the growing season, or leave them until early spring?

Hall—I should leave them until spring, so as to have more wood to work upon in case of partial winter-killing.

AT THE OCTOBER MEETING

The essayist for the day, Prof. Barler, read the following:

MANURES.

Anything that promotes the growth of plants, when applied to the soil, is called *manure.*

It may be a vegetable, animal, or mineral substance.

To know what will promote the growth of a plant, we must study the plant itself, and ascertain, if possible, what are the constituent elements of plants, organic and inorganic.

Organic elements are the portions that pass off in the air when burned. The parts that remain are called ashes, and constitute the inorganic elements.

The organic elements are oxygen, hydrogen, carbon, and nitrogen.

The inorganic elements are soda, potash, lime, silica, iron, sulphuric and phosphoric acids, etc.

These elements are the appropriate food for plants, and if wanting in the soil, must be supplied, if we expect the best results.

Not all the elements are found in all plants, nor in the same proportions.

For example: in grains, phosphoric acid predominates; in root crops, potash abounds; and in grasses, fruit and forest trees, lime is a most important element.

These are foundational truths, which every tiller of the soil must know, in order to the judicious manuring of land.

It would be wholly out of place, on this occasion, to enter, at length, the discussion of this subject.

To offer two or three practical hints is all that will be attempted.

As before stated, we have vegetable, animal, and mineral manures—all of them valuable, but not equally so, to all kinds of soil.

Where a soil is wanting in organic matter, vegetable manures are demanded. Of these, clover is, probably, the best in this part of the country.

The broad leaves of the clover draw from the air an immense amount of fertility in the shape of carbon, amonia, and nitric acid, which, when buried beneath the soil, yield up their stores of wealth in most grateful style. While the leaves are thus active, the long, heavy, searching roots are not idle, but are plowing the subsoil far and wide, compelling it to give up those mineral substances which are so effective in the perfecting of plant life.

Of animal manures, the stable furnishes the standard article—more valuable, powerful, and and lasting than any vegetable substances.

We have not time nor patience to apostrophize in regard to the practice of a class of farmers who are so eternally busy that they never get time to save and apply these elements of fertility to their soil. We have heard some hard stories about them, which we do not now care to repeat.

We have often thought if old Hercules, of antiquity, had been a farmer, and held the contract with those famed stables of his time, as he did, he would have acquired immense wealth, and died a rich man!

Raw-bone Superphosphate, which we have used for a few years with profit, is properly classed as animal manure. It is "meat and bone" ground up and dissolved in oil of vitriol. When pure, it must make a most effective manure. We have used it two years with results highly satisfactory, especially on cabbage, melons, and corn. We have reason to believe that on wheat and grains generally—but have not tried it—it will effect excellent results. Gardeners, especially, can hardly afford to dispense with this fertilizer.

Under the head of mineral manures we mention, as the most important, lime, gypsum, and ashes.

Lime should be applied in small qantities, and is especially beneficial to cold, stiff, sour lands. Its effect is to hasten decomposition and ameliorate the soil, aside from furnishing food for plants.

Gypsum is a sulphate of lime, and is especially beneficial in absorbing ammonia, and preventing its escape. It is sown upon grass lands at the rate of one bushel to the acre, with marked effect. In applying it to the potato crop we cut the seed potatoes, and roll them in the plaster. In applying to corn land we would adopt the same practice of coating the seed-corn with it.

Ashes are, perhaps, more valuable than either lime or plaster, inasmuch as they contain all the inorganic elements of plants, and generally in pretty nearly the right proportions. Even leached ashes are valuable, having lost only a portion of their potash and soda.

But this subject is so vast in its proportions, and has so many parts, it is impossible to do it justice here.

We add but one other remark in regard to the the management of manures.

We do not practice the "well rotted" system of composting, turning and overhauling, and holding on till the day of planting. If it had any advantages—which it has not—they would be more than overbalanced by the excessive labor which it necessitates.

We have, from necessity, spread manure in the spring and late in the fall, but will do so no more, if it can be avoided by doing it at the proper time.

Now is the best time. Now while the days are growing shorter, haul from your stables the green article itself and plow it under. It is worth double that which has decomposed and wasted in the sun and air, under the approved process. Then labor is less, and what is more, it is done at a time when other work presses not, and your conscience upbraids you not for other duties left undone.

The reports of the Committee on Entomology, Major Muhleman, Chairman, have been regular, practical, and interesting. We would insert some, did space admit.

Respectfully submitted,

DANIEL L. HALL, *Secretary.*

WARSAW HORTICULTURAL SOCIETY.

OFFICERS FOR 1871.

President—Asaph C. Hammond, Warsaw.
Vice-President—Dr. Charles Hay, Warsaw.
Secretary and Treasurer—Thomas Gregg, Hamilton.

ABSTRACT OF PROCEEDINGS—1870.

JANUARY, 26.

W. S. HATHAWAY read an Essay on the Deterioration of Fruits and Trees, and asked for criticism upon points presented.

The chair called upon Mr. Willis for his opinion upon what is contained in the essay about Pear Culture.

Mr. Willis—The more I study and examine, on these horticultural subjects, the more I feel myself a member of the know-nothing society. I have had several years experience in the cultivation of the pear, have now several hundred dwarfs and standards. I think dwarfs in particular need draining, and also need to be protected against wet. With proper culture and care, I think the pear can be made to do well here—in this respect differing from the essay. I shall continue to plant, and closer than formerly, setting standards about ten feet by twelve feet. I have also commenced root-pruning, and shall top-prune, likewise. I root-pruned, last fall, all the trees I have, in a thorough manner, about two feet from the stem, as a remedy for the blight, of which I have had some; have also lost some by drought. My trees have generally been well mulched with straw or cornstalks. I am satisfied a standard pear will blight sooner than a dwarf.

Mr. Spitze—I have both dwarfs and standards. The latter grow five or six years before fruiting. Dwarfs bear earlier. Those in wet-like ground died; those on poor ground, naturally drained, lived. Think the tendency of mulching trees is to cause them to grow in the fall. Would mulch in August, and take off the mulch afterwards, so as not to cause too late a growth.

Mr. Willis—My trees that were well mulched, ripened their wood well last fall—and that certainly was a growing season.

Mr. Whitaker—On the subject of the deterioration of trees, alluded to in the essay, I would say that, as to an inherent or constitutional change in the variety itself, it is not so clear; but that a deterioration will result from neglect or want of proper ingredients in the soil admits of no doubt. Am inclined to the opinion that deterioration results in no other way.

The President expressed the opinion that varieties do deteriorate, without regard to soil or surrounding circumstances; mentioned the Catawba grape and the Rawles' Janet apple as late examples.

As to pears, he believed that they can be made to do well here, with the right sort of care and management. He had seen, at the fairs and Society meeting, pears from all sections of the Union, and he could say that Illinois pears were equal to any. The California pears were larger and handsomer, but were not nearly equal in quality. He referred to Mr. Meehan's recommendation to allow pear trees to grow in sod—as being cooler by 20 degrees, and thus preventing a second growth of wood. He believed that anything that will prevent a second growth will prevent blight.

Mr. Willis—In reply to the opinion of Mr. Chittenden on the failure of the quince root, stated that he had, last fall, root-pruned all his dwarfs, as well as standards, and had invariably found the quince roots to be sound.

The Secretary remarked that he had frequently before called attention of the Society to the fact that nothing seemed to be settled. He read some extracts from a report of proceedings of the Adams County Horticultural Society, lately held, in which the *non-culture and grass-sod* theory was advocated by certain members, and repudiated the idea *in toto*. Talk of poor soil, and shallow culture, and sod, for fruit trees! As well recommend them for corn. For his part he believed that good soil, and deep and generous culture, was good for all kinds of fruit trees, as it was for corn or any other crop. He believed it to be utter folly for us to be drifting about in this manner. A year or two ago high culture was the cry. Deep tillage was the theory recommended by these men. Well, they planted pears, and they applied deep culture, and for some cause their pears have not answered their expectations. So they jump to a conclusion—good culture has done it! I don't believe a word of it. One man's trees in the dooryard sod have done well; have had no blight. Now I have a tree that blighted badly last season. Good culture did not cause it, for it had none for three or four years. Sod did not prevent blight, for it stood in blue-grass sod. I don't pretend to put forth a theory about pear-blight; I have none; but I do adhere still to the doctrine, and maintain that it is a sensible one, that deep culture and tilth are necessary among pear trees, or apple trees, or trees of any kind, although I have not practiced it as I have desired.

Mr. Willis referred to an old pear orchard at Riverside, whose owner has been absent for several years, and consequently the trees have had no culture, and stand in grass sod. Yet these trees are doing badly—are dying, and are badly blighted. He also mentioned another young orchard in deep sandy soil, and on side-hill bluff, with good natural drainage. These had received moderate cultivation. The blight is there also.

Mr. Brill suggested, that in Germany, the healthiest pear trees were seedlings.

Mr. Hathaway—Had blight in apple trees. Blighted in poor soil, and near hog-pen and manure heap; moderation is desirable; moderate culture—not too much, nor too little, is doubtless best. What does root-pruning do? If it checks growth of wood, and induces fruiting, why

not cause moderate growth by non-culture at first? He suggested that members who have blighted trees would examine them bodily, root and branch, and endeavor to find a cause.

President Hammond—I conversed with an Alton cultivator who says he has practically conquered the blight by root-pruning.

Mr. Chittenden mentioned his brother's pear trees in Keokuk: has fine crops yearly; trees stand in grass in his door-yard, and are let entirely alone, except to cut back freely. Invited members to go and see them.

Dr. Hay—I believe we have epidemic diseases that attack trees and fruits. I have read that the rot among grapes was not known in Europe or America till some twenty-five years ago. So mildew was not known till discovered in a hot-house in England. So with blight in fruit trees. So cholera in the human system, though long known in the East, only lately visited Europe and America. It baffled the skill of physicians, as these fruit-tree and other diseases are now baffling us. And I am in hopes that they will disappear as they came. Yet I would not recommend the do-nothing policy. We must not give up, but use our skill and judgment in seeking for the cause and the remedy.

FEBRUARY 23d.

THE PRESIDENT, A. C. Hammond, Esq., as essayist for the day, read the following essay:

INFLUENCE OF THE STOCK AND CION UPON EACH OTHER.

BY A. C. HAMMOND.

Whatever opinions may have formerly prevailed among orchardists, it is now generally conceded by intelligent writers and cultivators, that the stock affects the fruit of the cion, in quality, productiveness, and time of bearing. And that the cion increases or retards the growth of the stock, and in some instances imparts its own peculiarities to the root. Because a tree, under certain conditions, is tender and unproductive, it does not necessarily follow that under all conditions it will be so. Every observing orchardist has noticed the difference in the growth, hardiness, and productiveness of the same variety, when a portion of his trees have been root-grafted and a portion top-grafted. Some varieties succeed best on their own stock, others on a borrowed one. It is, therefore, evident that we cannot be governed by any arbitrary rules in this matter, but must be guided by the light of experience, and should study the habits and peculiarities of each variety, if we would obtain the best results.

Some horticultural writers tell us that root-grafted trees are short lived and unproductive. Others that they are superior to those propagated in any other way. Probably these opinions have been reached without proper investigation, and both are partly right and partly wrong. For, as I before remarked, it is very evident that some varieties are success-

ful root-grafted, and others are not. For instance, the Red June, which has a great number of small, fibrous roots, reaching but a short distance, soon absorbs all the specific elements necessary for the formation of perfect fruit, when the fruit becomes small, scabby, and worthless. But if double worked on a strong free-growing stock, well supplied with strong, far-reaching roots, like Pennock or Pryor's Red, it succeeds much better, but it is longer coming into bearing. The Westfield Seek-no-further and Wagoner, when root-grafted throw up a great number of water sprouts, which affect the growth and the health of the tree. But when worked above the collar, this objection is obviated, and the tree is much more healthy and productive. Again, the Yellow Bellflower, Summer Queen, and Red Astrachan, root very readily from the cion, and thus soon become established on their own roots, which are very strong and numerous. In this condition they grow very rapidly, expend all their energies in producing wood, and, therefore, yield little or no fruit. But top-work them on a slow growing stock, and they become productive. On the other hand, the Ben Davis, Little Romanite, and Maiden's Blush, being well supplied with both fibrous and large extending roots, grow very rapidly, come into bearing early, and annually produce large crops of perfect fruit. Top-grafted, they grow with less vigor and are not so productive.

But, says the planter, if all varieties do not succeed root-grafted, why is this mode of propagation so universally practiced by our nurserymen? Why do they not rather propagate each variety in that way that will make the most successful tree? We must bear in mind that we live in an age of tree-planting; that the demand is for cheap trees, and that it often exceeds the supply. And when we remember that root-grafted trees can be put into market in half the time and for half the price of those stock-grafted, we shall be able to understand why all are propagated alike. There are doubtless some varieties, which, if double worked on such a stock as the Pryor's Red or Ben Davis, would be intrinsically worth five times as much as when they are propagated in the usual way. And in my opinion, the time is not far distant when our western planters will understand this matter, and be willing to pay for trees in proportion to their value. And, as the demand increases, our enterprising nurserymen will soon be able to furnish the requisite supply.

That I may not be misunderstood on this point, I will say that in my opinion, root-grafted trees are just as reliable as they would be stock-grafted on promiscuous seedlings. And that to secure the best results, we must work those sorts that do not succeed root-grafted, on certain cultivated varieties that we know will produce the desired results.

Fruit trees are generally dwarfed by working them on an uncongenial stock, or, a stock that does not form a perfect union with the cion. The sap is thus checked in its downward flow, and the result is the formation of fruit buds and the early fruiting of the tree. Dwarf apples, pears, and cherries, are very appropriate for small gardens and ornamental grounds; but are totally unfit for orchard planting, as many

a planter has discovered to his sorrow, after having been persuaded by a smooth-tongued eastern tree-peddler, to buy and plant them as orchard trees. Some instances are recorded of large profits realized from dwarf pear orchards, but standards are undoubtedly the most valuable for commercial orchards. The so-called dwarf peach and plum trees are produced by working them on the Chickasaw stock. They are only slightly dwarfed by this process, and the only benefit arising from it, is their partial exemption from the peach borer; but this is more than counterbalanced by the great number of suckers thrown up from the roots. The nurserymen find them more profitable than the fruit grower.

As to the propriety of grafting old orchards, there is much diversity of opinion. In the Eastern States, they find no difficulty in changing the tops of their trees from one variety to another; but our climate is so fickle, and we have such great extremes of heat and cold, that it is very difficult to get a new top established on a tree after it has reached the age of twelve or fifteen years, without a portion of the old wood becoming diseased. Yet we have so many varieties that are but cumberers of the ground, that it becomes necessary to make many changes. And here the question arises: "What varieties shall I work on my unprofitable trees to secure the best results?" All of us have more or less of Red June, Summer Rose, and Newark Pippin, which are very slow growers and have been found unprofitable. On these I shall work Yellow Bellflower and Red Astrachan, as the stocks will dwarf them sufficiently to bring them into early bearing. Some of us have planted quite largely of Winesaps—from twenty to fifty per cent. of our whole planting. While I would not think of discarding this variety yet, it has suffered so severely from scab and spur-blight the past season, as to cause it to be looked upon with some suspicion. I would suggest the propriety of reducing it to fifteen or twenty per cent. of the whole number of trees in the orchard. Upon my own trees of this variety, I shall work Red Canada, Grimes' Golden, and Willow Twig.

In many orchards we find White Bellflower, White Winter Pearmain, Summer Queen, Limber Twig, Grindstone, and numerous varieties of sweet apples, which have been found to be worthless. On these I should not hesitate to graft Peck's Pleasant, Red Canada, Maiden's Blush, and Willow Twig, as these varieties will succeed under any ordinary circumstances. True, many of these trees will not make first-rate, or even second-rate stocks; yet when they are under ten or twelve years old, it will be found profitable to top-graft to some productive variety.

As belonging to the topic for discussion, Mr. Willis presented sections of a seven-year-old pear tree, cut from the stem, near the root, showing discolored and peeling bark around the whole body, while cuttings from the top are fresh and green. His inquiry was, What has caused this tree to die? He had root-pruned it in November, when it was perfectly sound, and the wood had seemed to be well hardened. Was it killed by the hard freeze in October?

President Hammond expressed the opinion that the injury was occasioned by the October freeze, and is what is termed sap-blight.

The Secretary suggested that it may have been occasioned by too close and too severe root-pruning in the previous fall.

Mr. Grover—As to discarding those standard varieties, as recommended in the Essay, I think it is too soon yet. To be sure some of them are doing badly. Red June for two or three years has scabbed badly in most orchards; but has read that high culture will probably remedy that defect. Early Harvest is reported as doing well till within a year or two. Is a showy apple, and sells well. So with several others of our most reliable apples heretofore. Probably high culture will remedy their defects. But I think it is too soon to give them up. As to grafting, shall go into it cautiously; shall top-graft a few only at a time.

Mr. Hathaway—Nearly all varieties scabbed to some extent last season in my orchard; Yellow Bellflower the worst. I thin out many of the small branches in the spring, thus thinning the fruit, and securing larger and fairer fruit, and of better quality.

The President inquired of Mr. McCune concerning the Bellflower on his farm—the old Dr. Griswold place.

Mr. McCune—My Bellflowers have borne two good crops since I have owned the orchard; do not know how much they had done before. They are top-worked trees. Some of them are planted in a body together, and some are scattered among other trees in the orchard; and I notice a fact for which I am unable to account, that those planted together do better than those scattered about.

President Hammond—Those Bellflowers of Mr. McCune's are probably the best bearers of that variety in the country, which I ascribe to the fact that they are top-grafted.

Mr. McCune—The year before I came to the place Winesaps bore a heavy crop; next year a light crop. Last fall they scabbed badly, and I got none worth saving. The size is also an objection to the Winesap; it is too small. They will not sell as well as a larger, though a poorer apple. My best selling apple last fall was the Lyman Pumpkin Sweet. Pryor's Red is healthy, hardy, and profitable; Red Canada, perhaps, the most profitable.

Mr. Homer D. Brown, of the Montebello Nursery, presented a number of specimens from his nursery of the wood of different varieties of apples, showing the effect of the past winter, some of them being very badly injured, and some only slightly. Those specimens were cut from his one and two year old trees.

Of his one year trees, they rate as follows:

Ben Davis, Winesap, and Rawles' Janet, uninjured.

Red June, Red Astrachan, Early Harvest, Vandevere, Little Romanite, White Winter Pearmain, badly injured.

Willow Twig, Rambo, and Maiden's Blush, very badly; the last worst of all.

Of two year trees: Ben Davis, Winesap, and Rawles' Janet, were sound; while Little Romanite, Early Harvest, Red June, Pearmain,

Jonathan, Red Astrachan, and White Bellflower, were very slightly injured; and the Maiden's Blush and Rambo, badly.

The Secretary submitted the following, and moved its adoption, viz:

Resolved—That we recommend the Morello as a stock on which to work the less hardy and finer varieties of cherries.

Mr. Willis suggested a modification, to include those only that will not overgrow—which was accepted by the mover.

Mr. Crouse objected to the Morello on account of its sprouting qualities, and suggested that the Mahaleb was also a slow grower, and would make as good a stock.

JULY, 27.

Society met at the residence of Mr. Louis Stracke, in Warsaw.

A ramble over the grounds of Mr. Stracke reveals what drainage and deep culture will do. His 1300 pears, all under-drained, and thoroughly cultivated, look green and healthy; while his grapes, under-drained and trenched, are looking extremely well--especially an acre of two-year-old Delawares.

President Hammond requested Dr. Hay to take the chair, which he did, and called the meeting to order, stating that the subject for discussion to-day is, " Small Fruits—Modes of Culture."

The Secretary said he would set the ball rolling by mentioning raspberry culture. He had formerly allowed the canes to grow too long. The true system is to cut or pinch back the new shoots as soon as they reach a height of three feet, or even less. This will be late in June; they will then throw out lateral shoots. These side shoots should also be shortened as soon as they reach one foot or fifteen inches in length. This shortening in causes the plants to grow more stubby, and they stand up better, besides yielding a larger quantity of fruit. In this way they require little or no staking; though a single wire run along the row two feet or two and a half from the ground, furnishes a good support. They should be tied to it with a coarse string or bark. As soon as the fruit is off, the bearing wood should be cut away. This treatment, with good cultivation and thorough mulching, will ensure a good crop of raspberries or blackberries.

The red sorts, such as do not take root from the tips, but sucker so profusely, he had long ago discarded; but believed that by close attention and free use of the knife and hoe, good crops of these also might be had.

Mr. Chittenden combatted the idea of cutting back, as requiring too much time and instanced the cultivation of the Red Antwerp and Golden Cap, in cases where they were allowed to do as they pleased --good crops being the result. Had tried cutting back and cultivating, both with raspberry and Lawton blackberry, and should do so no more.

Mr. Crouse advocated the theory of good culture and cutting back, as the true way to grow the raspberry and blackberry, and insisted that much larger crops of better fruit could be obtained in that way. He mentioned several varieties—Mammoth Cluster, Doolittle Black Cap, Franconia, Philadelphia, etc.—that were doing well in his grounds.

Mr. Willis grows the Ohio Everbearing chiefly. Believes in deep culture, thorough culture, and mulching. By this method he gets a fair crop all summer. Has tried the Catawissa, the Red Antwerp, Philadelphia, etc. Thinks the Ohio is preferable to all others.

President Hammond expressed the opinion that cutting back was the true theory, in most cases, but would not cut the Lawton blackberry so much. He believed that it had a great influence in causing the wood to harden, and thus prevent winter killing.

AUGUST 31.

Meeting held at the Golden Bluff vineyard of A. H. and G. B. Worthen, four miles below Warsaw. The Messrs. Worthen have twenty-three acres in grapes, including the vineyards of T. A. W. and A. H. W. Junior, and from their respective vineyards there were upon the table twenty-nine varieties, viz:

Rogers' Nos. 1, 3, 4, 5, 9, 15, and 19, Martha, To-Kalon, Ives' Seedling, Concord, North Carolina Seedling, Diana, Clinton, Iona, Israella, Maxatawney, Creveling, Oporto, Perkins, Logan, Blood's Black, Taylor's Bullit, Norton's Virginia, Dracut Amber, Isabella, Miles, Delaware, and Catawba.

The vote taken on the quality of the grapes present resulted as follows:

Delaware, best; Iona, second; Rogers No. 3, third. There were also votes for Rogers No. 15, and Maxatawney.

DECEMBER 7.

REPORT OF COMMITTEE ON ORCHARDS.

The Committee on Orchards, with the limited opportunities for collecting information allowed them, will merely make the following statements:

APPLES.

With respect to apples, regarding both quality and profit, they will say that the question, what are the best varieties for summer, fall, and winter marketing, may still be an open one, requiring further experience to settle. As a general statement, the Early Harvest and Red Astrachan among the early summer; Maiden's Blush and Rambo among the fall, and Ben Davis, Willow Twig, Rawles' Janet, and Winesap among the winter sorts, with some have proved most successful, while in some of our largest orchards, especially that of Mr. McCune, Red Canada, and Pryor's Red, have also proved very satisfactory. With Mr. A. C. Ham-

mond, on an adjoining quarter section, several of the varieties found profitable in Mr. McCune's orchard have been very unsatisfactory. Especially is this the case with the Winesap and White and Yellow Bellflower, each of which has given satisfactory results with Mr. McCune.

It may be here stated that the orchard of the latter was planted in 1846–7, consisting of some sixteen hundred trees, embracing near one hundred varieties, about one-half of which may be said to have proved nearly worthless. That of Mr. Hammond, near by, was planted in part in 1850, and now consists of over twenty-three hundred trees, with about one hundred varieties—all of which, with the exception of some twenty sorts, have proved nearly worthless. It is proper to remark generally, that each quarter section, and each locality on each quarter section, has its peculiar characteristics, which seem to suit the habits of one or other of these varieties better than others. Of one thing further the committee feel assured—that an orchard of the most hardy and productive varieties must be cultivated with care and judgment, to insure success. Aside from the depredations of insects which must be combated, we may as well look for repeated large crops of wheat and corn from the same ground, without restoring its fertility by proper manuring, as to look for repeated large crops of apples without restoring the loss sustained. This remark is especially true of orchards which have passed their twentieth year, when the period of decay with many varieties may be said to have set in.

PEACHES.

With regard to successful peach culture, the committee will say that no commercial orchard has yet been brought into bearing in our vicinity; but from the success attending small orchards, we feel authorized to say that, on the bluffs of the Mississippi at least, there seems to have been reasonable encouragement for the future pursuit of this branch of fruit culture. Mr. B. G. Grover, on the bluff immediately near the river, from an acre of peach orchard, all seedlings, marketed this year one hundred and eighty bushels in Keokuk, at an average price of one dollar aud fifty cents per bushel. The same ground contained, scattered among the peach trees, eight Rawles' Janet apple trees, from which were marketed sixteen bushels of apples. The peach orchard is ten years old from the seed—has had no cultivation for four years, and is now well set in clover. The custom of planting peach trees alternately with apple trees has been tried by some, but has been generally abandoned or condemned, as not proving a success.

PEARS.

There are so far, no orchards of pears planted for commercial purposes, which have yet come into bearing. That of Mr. Louis Stracke, consisting of some thirteen hundred trees, mostly dwarfs, is in a flourishing state of growth, but has not yet borne a crop. Mr. Stracke says, further, that whenever a tree dies, he follows Dr. Hull's advice, and replaces

it with a standard. The pear orchard planted by the late Abram I. Chittenden, of some five hundred trees, has died out, in a great measure from blight; but of those varieties still producing, his son tells us that the Duchesse d'Angouleme, Bartlett, and Seckel, have given the best crops.

CHERRIES.

We have not yet many cherry orchards of large size; but among the varieties so far planted for profit, the Early Richmond has given the most satisfactory results. The early sweet varieties are preyed upon by the birds so as to render them unprofitable.

CHARLES HAY,
WM. N. GROVER,
A. C. HAMMOND,
H. M. CROUSE,
E. MCCUNE.
Committee.

REPORT ON GRAPES.

The Committee on Grapes would respectfully report:

As far as our observation extends, most varieties have done finely this year. There have been a few sorts that have not averaged more than half a crop; but they had not probably recovered from the wet summer of 1869.

The Catawba seems to have taken the lead this year—setting and perfecting its fruit even better than the Concord. One vineyard, belonging to John Rinkel, of one and a fourth acres and nine hundred vines, made thirteen hundred gallons of wine, or nearly six quarts to each vine.

The Delaware did only tolerably well, and that is as much as could be expected, as the vines lost all their foliage by mildew the year previous, before they had ripened their fruit or wood.

The Iona has done better than ever before, having held its foliage and ripened its fruit. One of the Committee has been able to make five gallons of wine from three hundred vines three years old! [*Note by the Secretary*—The birds are said to have taken two-thirds of the fruit, and the family used them quite freely—two facts certainly expressive of the quality, at least.]

Clintons rotted a good deal in some vineyards, and the fruit did not set as well as usual. They may have suffered from the drouth.

Concords did well, as they always do; and when the shoots were pinched to two bunches, the bunches were very large.

The Virginia Seedling perfected a very heavy crop where the fruit was grown on spurs.

All of the Rogers' Hybrids that have been fruited here have given good satisfaction.

Ives' Seedling did well, and the wine is preferred to the Concord by a good many persons.

Below we give the weight of the *must* of the wine grapes raised in

this vicinity. Also the statistics, as far as could be ascertained by the Committee, of the number of acres planted, the number of gallons of wine made this year, and pounds of grapes sold within the limits of the city of Warsaw and township of Wilcox, embracing an area of about twenty-five sections of territory.

WEIGHT OF MUST.

Delaware, Sept. 7-----103 degrees	Catawba, Oct. 3------80 degrees
Taylor, Sept. 8-------- 85 "	Clinton, Oct. 13------95 "
Concord, Sept. 11----- 80 "	Catawba, Oct. 24-----90 "
Virginia, Sept. 28-----100 "	

[NOTE BY THE EDITOR.—This list contains the names of 79 Grape Growers, with the No. acres each has in grapes, the No. lbs. fruit sold, and the No. gals. wine made by each; making in the aggregate, 209 acres; 138,100 lbs. sold, and 39,873 gals. wine made. Want of space excludes the details.]

Of course a number of small lots are not enumerated in the above; while of some of the acres named, the yield could not be ascertained. Portions of the above are in their first and second years of growth.

Other members of the Society, residing outside of the limits named, have more or less of vineyard, the product of which is not included in this table. Among these, the most noteworthy, is that of Mr. Gabriel Marlot, ten miles east of town, consisting of about fifteen acres, of various ages and sorts, producing this year about seven thousand gallons of wine.

Respectfully submitted,

GEO. B. WORTHEN,
WILLIAM BAUDER,
LOUIS STRACKE,
CLAUS ALBERS.
Committee.

DECEMBER, 28.

A. C. Hammond, Esq., President of the Society, read the following

ANNUAL ADDRESS.

Custom demands of me, as your presiding officer, a few remarks, at this annual meeting. I shall endeavor to be brief, that we may proceed with the regular and more important business of the Society.

Perhaps we may, without egotism, congratulate ourselves that we are making some progress, and with each passing year beginning to understand the peculiarities of our surroundings, and some of the causes of our many failures and disappointments.

But—asks one—why so many failures in Horticulture?—for they are apparently the rule, and success the exception. As a business is it not attended with so many fluctuations and subject to such great risks, as to make it unsafe for a man to enter into it as a means of livelihood? In other words, *Will it Pay?* This is the all-important question to be

decided, when about to embark in any business, and should be carefully considered and wisely decided. In its solution, we should bear in mind that this pursuit is governed by the same laws that prevail in other callings. In all the departments of business into which men enter as a means of livelihood, some succeed and others make lamentable failures. In fruit-growing, the man who is patient, persevering, industrious, and shrewd, will make it pay. All others will fail disastrously.

The products of Horticulture, being generally considered articles of luxury, are subject to more violent fluctuations than those of prime necessity. There are certain great staples—such as wheat, corn, and beef—that are always in demand; and if the market is temporarily depressed, they can be held without loss until it revives. But our strawberries, peaches, and grapes must be sent to market when they are ripe; and if it is overstocked, we must sell for what we can get. It is, however, a well-understood fact, that articles of luxury often come into general use, and thus, after a time, become articles of necessity. So it will be with all our finer fruits, as the supply becomes more reliable and prices better regulated. It may be safely laid down, as a general rule, that the demand for any product increases with the supply.

The grape crop of the present season illustrates this principle. The supply has exceeded that ever grown before fully one hundred per cent., yet the amount sold in our great markets has fully kept pace with the increased supply. We may, therefore, reasonably conclude, that the supply of really good fruit will not soon be greater than the demand; but inferior fruit is always a drug in the market. The past fall, poor to fair apples have been selling in the St. Louis and Chicago markets at from one to two dollars per barrel, while really choice fruit, in good order, has brought from three to four dollars much more readily. From these facts we should learn valuable lessons, and make it a point to grow nothing but the choicest, though the quantity may not be so large. To bring about this result, we must plant only the best varieties, cultivate well, prune judiciously, and fight persistently the insects and diseases that annoy us.

Speaking of insects and diseases reminds me of the suggestion of a friend, that they may not be enemies, but blessings in disguise. That if we were free from them, the over-production would be as great as in California, where the finest fruit—such as pears and peaches—is consumed by the hogs, or permitted to rot on the ground. There no special skill or industry is required, and the fruit grower can make nothing. Here he must be persevering, skillful, and industrious, and his reward is sure.

While this subject is before us, let us stop to enquire if there is any practicable way of arresting the ravages of our most destructive insect, the Codling Moth. Unless some parasite attacks them, or we can devise some method of trapping them, the time will very soon come when we shall be exempt from the great drawback of the California horticulturist. The past season this insect has utterly ruined the fruit in many orchards in this county, and unless a united and persistent effort is made to destroy them, we may expect them to be more numerous the next year; for we

find them secreted in every available place in the orchard, and buildings and cellars where apples have been stored. I have, during the past year, tried the plan of placing rags in the forks of the trees, and find that great numbers of them can be trapped in this manner. The cloth band is, however, much more effective, as the worm, in its downward journey, is sure to come in contact with it, and finding it to be a convenient place, spins up and goes into the chrysalis state. Vast numbers of the first brood may be destroyed by pasturing the orchard with anything that will eat the fallen fruit, as it drops before the worms escape. But the second brood generally leaves the fruit while upon the tree. Hence our dependence must now be on the cloth band. Old gunny sacks will be found to be the cheapest and best material, as they can be removed from the tree, and the insects killed by scalding, or some other process, and then carefully replaced. Very little can be accomplished in this direction, however, without concert of action; for my neighbor may carefully destroy the larvæ in his orchard, yet if I permit mine to become a breeding ground for the moth, he suffers from my negligence almost as much as myself.

When we take into consideration the difficulties, and on the other hand, the great importance of horticultural pursuits, in a moral, esthetical, and sanitary point of view, we can but wonder at the indifference manifested in relation to it, by the great mass of our people. Is it not passing strange that our Society, situated in the midst of one of the best fruit-growing districts in the West, should have so few earnest, working members?

* * * * * * * *

In conclusion, let me for a moment speak of the responsibilities that invite, and the duties that urge us on, in this beautiful profession, for they are many and pressing; but its reward is ever present. The man who dwells in the midst of Pomona's treasures—whose garden is fragrant with the blooming rose, and around whose roof-tree the honeysuckle twines, lives in a pure and refining atmosphere. With such surroundings nature grows brighter; in such a home man grows better.

Home is not simply a dwelling place, in which to eat and sleep and spend our leisure hours; this would identify it with the wigwam of the Indian, the ice house of the Esquimaux, or the ruder hut of the South Sea Islander; but a place where the higher elements of man's nature are brought into action, and where he may and should create a little world of beauty. Man's first home was in Eden, where grew goodliest trees, loaded with fairest fruit—

> "Blossoms and fruit at once of golden hue
> Appeared, with gay enameled colors mixed,
> On which the sun, more glad impressed his beams
> Than in fair evening cloud, or humid brow,
> When God has showered the earth, so lovely seemed
> The landscape."

His last home will be in heaven, where upon the banks of the Crystal River grows the Tree of Life, which yields immortal fruit, and "whose

leaves are for the healing of the nations." In creating our earthly homes, the nearer we make them approach our final one, the more perfect they will be.

CONCLUSION.

In concluding this report for the year, the undersigned will only cite the following as items of the most especial interest to the fruit grower in this section of the State:

1. The unprecedented grape crop, and the marked absence of its diseases and insect enemies.

2. The superior quality of the wine made.

3. The unusual prevalence of the pear blight; seemingly attacking all varieties, and trees in all conditions of growth and culture.

4. The increase of many of the insect enemies, more especially the Codling Moth, and in some instances, the peach Curculio.

5. The increasing attention given to the planting and culture of small fruits for market.

TH. GREGG, *Secretary.*

GALESBURG HORTICULTURAL SOCIETY—ITS ORGANIZATION AND ITS WORK.

BY J. S. M'CLELLAND, SECRETARY.

On the 25th of February, 1869, a notice appeared in the Galesburg *Free Press*, calling a meeting of Horticulturists at the residence of Prof. J. V. N. Standish, which meeting was held, according to the notice, and preliminary steps taken toward forming a Horticultural Society.

At an adjourned meeting, held March 11th, 1869, this Society was fully organized by adopting a constitution and by-laws, and by the election of officers.

At a meeting held on the 16th of March, reports were read from the different members of the Committee on Flower Seeds and Bedding Plants.

T. J. Hale gave his views on various flowers, which were received with great attention. He said the French and German standard Asters are very desirable—the dwarfs unworthy of cultivation. Many of the newer kinds of Balsams, especially the dwarfs, are exceedingly fine, and should be largely grown. The Chinese and Japan Pinks are among the finest of garden flowers; with a good assortment of these alone, you can have a splendid flower garden from June until October. The double Portulaca should be planted by all. The auricula-flowered Sweet William has been greatly improved, and is now very fine. The double Zinnia should be propagated under glass to secure the best results. The Verbena we all grow, and know its beauties; some kinds will not bloom well if allowed to root at the joints, others do better thus, only experience can teach us how to treat them. The finest of all bedding plants is the Zonale Geranium, and it should be extensively grown. He had a scarlet one last year that was a perfect mass of brilliant flowers, from eight to

ten inches in diameter. The variegated Dahlias are better than the selfs, but even they do not generally give good satisfaction. The Gladioli are at the head of all flowering bulbs, and are worthy of all praise. Every garden should be supplied with the newer sorts, which are indeed superb They are as sure to grow and bloom as a thistle.

On the 29th of March the discussion was on the Grape.

President Fuller has not had a great deal of experience with the Grape, but has tried trenching, and has experienced the best results. He dug his trenches two feet deep, and then put in bones, lime, plaster, etc., and had them spaded in with the sub-soil; then he put back the top soil, and planted his vines. Was careful to have his ground so drained that the water would be carried away from the trenches. His vines had made a growth the first season of from 8 to 10 feet. Did not know whether his success depended entirely upon this method of planting. He planted principally Rogers' and Allen's Hybrids, and Delawares. Thinks trenching very important. Everybody admits Delaware to be the best native grape, yet we do not want all Delawares; a variety is indispensable.

R. W. Hunt thought this a very important question. He grows Hartford Prolific, Concord, Delaware, Clinton, and many others. He liked Clinton; it was a late and a good grape. He gave great credit to those who have brought forth new varieties, but we should obey that precept of St. Paul: "try all things and hold fast that which is good." Those grapes that did not prove to be valuable, should be thrown over the fence. He expressed himself as entirely opposed to trenching. We should endeavor to keep the roots as near the surface as possible. Any soil that will grow good corn will grow good grapes. They should not be plied with stimulating manures, nor the roots driven down into stagnant water nor uncongenial soil. Such treatment has brought disease and death among our grapes. He read from authorities to prove his positions. His sytem of planting would be to stake off the rows and then turn furrows up on both sides, planting the vines on the ridge, and having an open furrow between the rows to carry off the surface water. Would not use a particle of manure, but would mulch. The roots *must* be kept near the surface if we would have healthy vines.

Pres. Fuller did not believe in high manuring, and when trenches were used they should be drained.

Mr. Hunt said the drains should not be under the vines, but between the rows.

Judge Kitchell has had some experience. He had planted vines near his house, on the east and south sides, which bore well and the fruit did not rot, while that on other vines, well drained, 30 feet from these, rotted badly. The vines near the house were planted on top of a pit, some four to six feet deep.

Mr. Hunt stated that all vines here should be covered through the winter to secure the best results. He laid his on the top of the ground and threw a couple of inches of soil over them. They should not be trimmed too much. To severely prune our most vigorous vines injures them very materially.

At the meeting on the 2d of April, Dr. Humphrey made some inquiries in regard to hot-beds, and was replied to by R. W. Hunt. He stated that he places the manure in a heap some time before it is wanted, and stirs it up frequently, but does not add water to it, though it might be necessary to do so if there were no rains. It is necessary to have the manure heat before it is put into the bed. Three weeks' heat is sufficient.

Dr. Humphrey never heats the manure before using it, as he thus prolongs the season of heat.

T. J. Hale recited his experience in regard to hot-beds. The manure should be as fresh as possible, and be well worked over.

The subject of the evening—the grape—was then taken up.

Mr. Hale said surface culture of the grape is very important. The culture should be deep for vines, garden, and the lawn, and should not be less than two feet. No plow should be taken into a garden. It is no sort of use. The spade and fork should alone be used. On gravelly soil there would not perhaps be the need for deep culture there is here, where we have a clay subsoil. The need of deep culture here is to lower the water table. Unless we assist the water in escaping, the ground becomes water clogged. Deep culture should always be performed in the fall, and not in the spring. Does not believe in cultivating a few feet wide for grapes. The vines should be planted just as deep as they were raised. Care should be taken not to plant too deep. After planting, the ground should be kept forked up. Mulching has a tendency to keep the ground cold, and is bad for the grape. The roots should be allowed to run into the ground—it is not necessary to keep them near the surface. He does not like close pruning. It is not good policy in this country, though it may succeed in the humid soil of Europe. The public are being taught to plant the rank growing grapes. Any one can raise a Concord grape—or field corn—but he would not reccommend a horticulturist to raise field corn in his garden, or Concord or Hartford grapes in his yard. The slower growing vines, such as the Delaware, Iona, and Rebecca, he would recommend. They will not need continued cutting back to keep them in their proper space. The first year of bearing, the Concord will exceed the Delaware, but forever thereafter the latter will produce more pounds of much superior grapes. He regards the Delaware as the best flavored of either native or foreign grapes. The Iona may prove good. Next to the Delaware is the Diana, which, although somewhat of a gross grower, is a good grape, and one that everybody can grow. The Creveling is good, but its southern origin may make it tender. He said he had planted 39 varieties, and in this way expected to test which is best to grow here.

Rev. W. S. Balch thought we should try different exposures, as this has a great deal to do with the quality of the grape.

Mr. Hale thought no grape will ripen without exposure to the sun.

R. W. Hunt was opposed to deep culture, but did not think twenty inches was more than surface culture. Grape borders are injurious where the land is not drained. He advocated shallow planting. They should not be planted deeper than six inches.

Mr. Hale thinks fall planting best, and Mr. Hunt coincided with him.

At the next meeting the discussion on the grape was resumed.

Judge Kitchell stated that the Isabella *did* and the Iona *did not* ripen for him, in a shaded position.

T. J. Hale, from the committee to prepare a general and an amateur list of grapes, reported the following lists:

Select List, No. 1—Delaware, Creveling, Diana, Concord, Maxatawney, Hartford Prolific, Rogers' Hybrids, Nos. 3, 4, and 15, and Clinton.

Select List, No. 2—Rogers' Hybrid No. 19, Salem, Lenoir, Allen's Hybrid, Iona, Walter, Martha, Miles, Israella, and Ives' Seedling.

The report of the Committee was adopted.

The first list is the one recommended to all as hardy, easily raised, and satisfactory; while the second list contains those more tender or yet untried here, though perhaps of equal or superior flavor.

Mr. Hale stated that the Creveling is to be one of the most delicious grapes on the list. It is a rank grower, and is inclined to be a little late, but with a proper exposure will prove a fine grape. The Lenoir is the earliest of the grapes, having a southern origin, is a fine grape, and needs a southern exposure to ripen the fruit.

During a discussion on shade trees, many of those now most frequently planted were strongly condemned, and a decided preference seemed to be manifested for the elm and sugar maple. The opinion seemed also to be universal that no tree should be planted more than two inches deeper than it originally grew.

On the 25th of May, T. J. Hale, in a discussion on the Flowering Shrubs, said that we should pay more attention to many of them.

The Rhododendron is the most beautiful of this class, and he thought that with proper care it could be grown here in perfection. He was experimenting with them, as was Secretary McClelland, Prof. Standish, and others. Their adaptability to our soil and climate will thus be thoroughly tried.

The Azalia is a very fine deciduous shrub, perfectly hardy, and should be planted a great deal more than it is. The Tartarian Honeysuckles, in different colors, are very effective. There are about a dozen varieties of Weigelias. Some of the Spiræas are fine and exceedingly ornamental, while others are poor.

J. S. McClelland urged the planting of azalias; they are beautiful shrubs, and with him have proved perfectly hardy. His success with the rhododendron has not been encouraging, having succeeded in securing blossoms but one year.

A most successful FAIR was held by the Society in the afternoon and evening of Saturday, June 19th. The largest hall in the city was filled with tables, on which were exhibited the choicest flowers, flowering plants, and fruits. It was estimated that more than three thousand persons visited the exhibition. Admittance was free, and one hundred and

eighteen premiums were awarded. It was a decided success, and by it the membership of the Society was increased fully one hundred.

A meeting of the Society was held at Dr. Humphrey's fruit farm, January 25th, 1870.

Orchard fruits being under discussion, the Doctor presented forty-two varieties, which the Society proceeded to discuss and test. Owing to the large number of varieties, there was, perhaps, more *testing* than discussion.

The following was recommended as a list of one hundred apple trees:

SUMMER APPLES.

2 Keswick Codlin,
2 Early Harvest,
2 Duchess Oldenburg,
2 Red Astrachan,
1 Red June,
2 Benoni,
1 Sweet June.

Varieties, 7; trees, 12.

AUTUMN APPLES.

2 Fameuse, or Snow,
3 Maiden's Blush,
1 Autumn Swaar,
2 Rambo,
1 Bailey's Sweet,
2 Fall Pippin.

Varieties, 6; trees, 11.

WINTER APPLES.

6 Jonathan,
5 Domine,
4 Roman Stem,
3 Yellow Bellflower,
5 Fulton,
2 Northern Spy,
5 Rawles' Janet,
3 English Golden Russet,
5 Tolman Sweet,
6 Willow Twig,
3 Milam,
3 Ramsdell's Sweet,
5 Ben Davis,
3 Westfield Seek-no-further,
3 Smith's Cider,
3 Prior's Red,
4 Wagoner,
3 Michael Henry Pippin,
3 Peck's Pleasant,
4 Winter Swaar.

Varieties, 20; trees, 77.

Prof. Standish, from the Committee on Small Fruits, reported a list of small fruits, which was discussed, amended, and adopted as follows:

Strawberries—Shaker's Seedling, Downer's Prolific, Downing's Seedling, French's Seedling, Green Prolific, Russell's Prolific, Wilson's Albany, Lenig's White; and for trial, the "President Wilder."

Currants—Red Dutch, White Dutch, Cherry, and White Grape.

Raspberries—Doolittle Black Cap, Miami Black Cap, Purple Cane, Davisson's Thornless; and Ellisdale and Clarke for trial.

Gooseberries—Houghton's Seedling, American and Mountain Seedlings, and Whitesmith English.

Blackberries—Wilson's Early and Kittatinny.

Grapes—Delaware, Concord, Clinton (for cooking and canning), Rogers' 4, 15, and 19; Iona, Diana, Creveling, Hartford Prolific, Ives' Seedling, and Salem. For trial—Walter, Martha, Eumelan, and Israella.

An Election was held on the first Saturday in March, at which the following officers were elected:

President—A. Kitchell.

Vice President—Mrs. L. F. Chase.

Secretary—J. S. McClelland.

Treasurer—Miss Emily Post.

Executive Committee—T. J. Hale, J. W. Cothren, Dr. A. G. Humphrey, Mrs J. W. Tryon, and Mrs. F. Fuller.

The Second Annual Fair of the Society was held June 10, 1870, which, like the first, was very successful. At this fair the fruits, plants, and flowers were arranged in *classes*, which added much to the effectiveness of the display. We do not believe that a more successful exhibition of fruits and flowers has ever been held in the West.

At a meeting held at the residence of Secretary McClelland, on the 9th day of August,

Prof. Standish delivered a discourse on Bugs. He explained the habits of various bugs and beetles injurious to vegetation, and dwelt upon the best way of destroying them.

Ex-President Fuller had practiced sifting Paris green on his vines, of squash, melon, cucumber, and potato. It killed all the bugs of all kinds which infested them, and did not perceptibly injure the vines.

R. W. Hunt coincided with Captain Fuller in regard to his method of using Paris green. Has tried it with the best results.

After a discussion on the birds that should be destroyed by horticulturists, by various members of the Society, it was decided to devote the next meeting to an address on birds. Dr. Humphrey was invited to open the discussion by a speech on that interesting subject.

"What *birds* are injurious to the horticulturist?" is a question frequently discussed in the Society.

At a meeting held August 23d Dr. Humphrey led off in the discussion on birds. He commenced by dividing the birds into seven orders: *Raptores* (robbers), *Passeres* (perchers), *Scansores* (climbers), *Rasores* (scratchers), *Cursores* (runners), *Grallatores* (waders), and *Natatores* (swimmers). The Doctor's remarks were more general than particular, although he would preserve the woodpecker family from the sports of the hunter. He thought that those birds that destroyed our fruits should be killed.

Mr. Standish was opposed to killing the birds, except those that do more harm than good. Most of the birds, save the hawk tribe, were insectivorous in their habits, and destroyed innumerable larvæ and insects injurious to vegetation. God made them for a purpose, and it is wrong to kill them. He deprecated the barbarous practice of men and boys assembling together, choosing sides, and having what is called a "shooting match." He mentioned two instances: one at North Bridgewater, Mass., the other on the Isle of Bourbon, where the extermination of the birds was followed by swarms of insects that made the region entirely barren and desolated. He was decidedly opposed to killing the robin.

Several members participated in the discussion; favoring the killing of those birds which greedily devour their grapes and cherries.

To amateur flower-growers there is no more entertaining subject than the winter treatment of bedding plants, roses, etc.

This subject was ably discussed at a meeting of the Society, held on the 12th of December.

R. W. Hunt opened the discussion. The treatment of roses is very simple. They should be taken up, set aside, and allowed to remain in a dormant condition for a long time, and only brought to heat and regular watering moderately. Geraniums may be taken up and put right in the house. Large ones should be severely cut back two or three weeks before lifting them. Roses, for winter blooming, should be prepared for it during the summer, by being kept in pots, and only allowed to make a moderate growth, and all buds carefully pinched off. They can not be made to bloom both summer and winter. None are at all suitable to take in the house but the monthly roses. Fuchsias should be treated the same as roses. They will not bloom in winter, if the buds are not pinched off in summer. He has not had much success in blooming carnations during the winter months. Camellias should have very careful handling. They will require the coolest part of the room, and must have an equable temperature, and must be watered carefully. There is more danger of over-potting plants than of under-potting. The quality of the pot has much to do with the health of the plants. The hardy plants should have the coolest part of the room, and the more tender ones—especially the the sub-tropical—the warmest. When plants are watered, it should be done thoroughly. Plants, when in bloom, require more water than when out of bloom. Keeping plants in small pots and withholding water will force them into bloom. Bottom drainage is useless when proper pots are used. The space which drainage occupies in the pot is much better to be filled with good soil. Cuttings of verbenas for winter blooming should invariably be struck in September. Verbenas will either grow or die; there is no half way with them.

Dr. Humphrey related his experience in growing plants in a lighted cellar. His success was not flattering.

A discussion on the proper temperature for plants ensued. The general opinion seemed to favor a temperature of from 65 degrees to 70 degrees in the day time, and from 45 degrees to 50 degrees at night.

T. J. Hale combated the statement that no drainage was necessary. Neither was it necessary to devote one-third of the pot for that purpose. He uses a great deal of charcoal for both drainage and to enrich the soil. He deprecated putting common soil in pots. Prepared compost should be used in all cases. Plants that are kept in living rooms are apt to be drawn and unhealthy. There are many that should be kept dormant through the winter. He uses a cold frame for this purpose.

A discussion in regard to the fundamental requisites for the growth of plants was carried on by Messrs. L. Woodard, Arthur Bryant, of Princeton, Parker Earle, of South Pass, and others.

R. W. Hunt advocated the mulching of currants. Mr. McWhorter said currants probably do better under a heavy mulch than any other fruit. If they are planted on the north side of a board fence and heavily mulched, they will do their very best.

The list of membership contains 134 names of gentlemen and ladies. This Society invited the Illinois State Horticultural Society to hold its Annual Session for 1870 at Galesburg, and when the invitation was accepted, did all they could to entertain its members and forward the interests of the Society.

Our Society has already accomplished a good work for Galesburg, and the interest in its meetings is constantly increasing.

J. S. McClelland, *Secretary.*

CENTRAL ILLINOIS HORTICULTURAL SOCIETY.

REPORTED BY GEO. HUNTER, SECRETARY.

This Society held its third annual meeting at Carlinville, Illinois, on the 7th, 8th, and 9th of February, 1871. The use of the City Hall was kindly tendered for the session, and the members and friends were entertained as the guests of the local Society.

A few words of cordial welcome were offered in behalf of the Macoupin County Horticultural Society by Capt. George Hunter, its Secretary.

President M. C. McLain, of Charleston, then delivered his annual address, after which cherries and plums were discussed.

The President's address was discussed in the evening. "The Neglected Spot in Horticulture"—an essay by Mr. Murtfeldt, of St. Louis—illustrated the subject of farmers' gardens, and elicited comment as to the ways and means of cultivating gardens.

The apple list was taken up, and a running fire of orchard experiences closed the first day's session.

Proceedings of second day opened with prayer by Mr. Murtfeldt, of St. Louis, and an essay, entitled "Hints and Suggestions on Raising of Fruits," was read by H. W. Davis, of Decatur, which raised interesting questions as to the standard of excellence among fruits, and the state of knowledge among planters, professional fruit-growers, and the public at large.

An essay sent in by A. L. Hay, of Jacksonville, on "Vegetable Gardening," was then read, and the discussion which followed turned princi-

pally upon the culture and consumption of asparagus and the uses of pieplant.

The afternoon of the second day was devoted mainly to Major Muhlemann's entertaining paper on "Mimicry in Insect Life." Though this essay was not in itself lengthy, it elicited lengthy discussions, and drew out the savants, and as Professors Riley and Tice of St. Louis were most prominent in discussion, their views will be given briefly in connection with Major Muhlemann's essay as published.*

The evening of the second day was devoted to President McLain's essay on "Dutch Bulbs," and the "Essay on Floriculture," by Dr. W. H. Chaffee, of Carlinville, and it is to be regretted that the rain storm of this evening prevented the attendance of such numbers as the occasion would have otherwise called out.

Proceedings of the third day opened with prayer by J. Huggins, of Woodburn, Ill.

The essay by E. Daggy, of Tuscola, Ill., on "Horticultural Humbugs," was read, and a lively discussion ensued, in which the question of wine and wine-making requested its right to be settled.

This was followed by an essay from A. A. Hilliard, of Brighton, Ill., on "Osage Hedging," and the subject was discussed at some length in its bearings on Horticulture.

"The best of the wine at the last of the feast" was given us on the afternoon of the third day, Professor Turner's lecture on "Climatology," and Professor Tice's lecture on "Terrestrial Radiation."

Nothing short of a careful perusal can do justice to these excellent productions. Vice-President's report by B. O. Curtis, of Paris, Ill.; reports of committees and reports of other officers were disposed of, and added to the list of material on file; and the Society elected its

OFFICERS FOR 1871:

President—M. C. McLain, Charleston, Ill.

Vice-Presidents—A. A. Hilliard, Brighton, Ill.; B. O. Curtis, Paris, Ill.; Isaac Baldwin, Jacksonville, Ill.

Treasurer—H. W. Davis, Decatur, Ill.

Secretary—Geo. Hunter, Carlinville, Ill.

MEMBERS FOR 1871:

H. W. Davis, Decatur.
D. S. Curtis, Paris.
Jno. M. Pearson, Godfrey.
J. Huggins, Woodburn.
B. O. Curtis, Paris.
Isaac Snedeker, Jerseyville.
M. C. McLain, Charleston.
E. Daggy, Tuscola.
E. McCarty, "
A. Wallace, "
C. McNutt, Tuscola.
Tyra Montgomery, Mattoon.
B. H. Burton, Arcola.
S. B. Dugger, Carlinville.
J. Baldwin, Jacksonville.
G. W. Hilliard, Brighton.
Geo. Hunter, Carlinville.
M. Eldred, "
A. A. Hilliard, Brighton.
F. Taggart, Carlinville.

NOTE.—The essay of Major Muhlemann has not been received for publication.—EDITOR.

NORTHERN ILLINOIS HORTICULTURAL SOCIETY.

The Annual Meeting of this Society for 1871, was held in Rockford, January 24, 25, 26. The meeting was well attended and all its sessions were interesting and profitable, a large range of horticultural topics being ably discussed.

The officers elected for 1871, are as follows:

President—Samuel Edwards, LaMoille.

Vice-Presidents—E. Ordway, Freeport; D. C. Scofield, Elgin; Lewis Ellsworth, Naperville; Robert Douglass, Waukegan; E. H. Beebe, Galena; Arthur Bryant, Jr., Princeton.

Corresponding Secretary—D. W. Scott, Galena.

Recording Secretaries—J.W. Robson, Galena, and H. H. McAffee, Freeport.

Treasurer—S. Woodard, Marengo.

Executive Committee—L. Ellsworth, E. H. Skinner, S. Edwards.

Princeton was selected as the place of the next annual meeting.

JO DAVIESS COUNTY HORTICULTURAL SOCIETY.

OFFICERS FOR 1871.

President—A. L. Cumings.

Vice-Presidents—Capt. E. H. Beebe, J. M. Harris, T. Hallett, Dr. E. D. Kittoe, D. W. Scott.

Corresponding Secretary—D. W. Scott.

Recording Secretary—J. W. Robson.

Treasurer—Robert Brand.

Executive Board—A. L. Cumings, J. G. Soulard, Mrs. D. S. Harris, Mrs. J. A. Newhall, Mrs. H. P. Corwith.

MACOUPIN COUNTY HORTICULTURAL SOCIETY.

OFFICERS FOR 1871.

President—Dr. Wm. Stevenson.

Vice-President—Wm. H. Fishback.

Secretary—George Hunter, Carlinville.

Treasurer—Milo Graham.

Directors—Dr. Wm. H. Chaffee, Geo. Fishback, Dr. J. P. Matthews, Henry W. Burton, A. S. Ruark.

HORTICULTURAL HISTORY.—ADDITIONAL COUNTY REPORTS.

FAYETTE COUNTY.

BY J. F. JERAULD.

MR. SECRETARY:

In compliance with your request, I will give a short synopsis of the Horticultural History of Fayette County.

The most of its surface having been originally covered with timber, makes it well adapted to the cultivation of such varieties of fruit trees, vines, and shrubs as flourish in this climate. The most of the early settlers availed themselves of these favoring conditions of soil and climate, and planted orchards of apples and peaches, together with a few pears.

But being far inland, and having to haul the fruit in wagons seventy miles to St. Louis, which was the only accessible market, and that over rough roads, injuring it in transit so that it was often sold for little or nothing, they did not find fruit growing a source of much profit; and in consequence, this branch of industry received a serious check.

The opening of the Illinois Central Railroad, however, revived the interest in fruit raising, by providing means for reaching markets, both in the North and South, and in bringing emigration from the East.

Many new orchards were soon planted, and old ones pruned up and put into shape; and, from that time to the present, fruit growing has been a success. Larger profits have been realized from a given amount of ground, with proper care, than have been realized from any other branch of agriculture.

APPLES.

Many varieties of fall and winter apples were introduced from the Rochester nurseries, knowing them to be good sorts or late keepers, but our soil and climate change the late keepers, such as Golden Russet, Rhode Island Greening, Gilliflower, Spitzenburg, and Bellflower, into fall apples.

Our Western nurseries furnish us with Winter Winesaps, Rawles' Janets, Romanites, Green Pippins, Limber Twigs, Baldwins, and many other good winter apples, salable in any market.

Our summer and fall varieties usually bring us from forty to fifty cents per bushel at home markets; while the winter apples range from sixty to seventy-five cents per bushel, at the nearest railroad stations.

PEACHES.

The soil, in many locations in our county, being excellent for peaches, several enterprising farmers have set out extensive orchards of peach trees, and have realized large profits from them.

This year has not been as favorable for budded fruit as some others, yet there have been about 30,000 boxes of peaches shipped out of Fayette County this year, at an average of about fifty cents per box.

They were shipped to Chicago, St. Louis, Iowa, and Minnesota, while a considerable portion went to Indianapolis and farther East.

GRAPES.

Grapes have been equally productive with peaches, and a large portion of the crop has been made into wine. Among the leading varieties are Concord, Isabella, and Delaware (many others being cultivated). The Concord takes the lead, as being the best bearer, and sells well in the market.

PEARS.

Pears are not successfully raised here, as the fire-blight destroys nearly all the trees.

Nectarines, *Apricots*, and *Plums* are so much the prey of the curculio and borer that people have become disheartened about trying to raise them.

This year my Nectarine and Plum trees were full of fruit, early in the season, which all dropped off or rotted upon the trees.

Small fruits, such as gooseberries, currants, strawberries, raspberries, and blackberries are pretty generally cultivated, and succeed well.

ALEXANDER COUNTY.

O. B. Galusha, *Secretary of State Hoticultural Society:*

Dear Sir:—On account of sickness I have been delayed in complying with your request in regard to the Horticultural History of Alexander county; and where so little has been done, a few words will be sufficient.

The north half of Alexander county is well adapted to fruit culture, being composed, or partly so, of the range of hills extending from the Mississippi to the Ohio river.

This range is, I believe, what geologists call Loess. It is rather broken, but is a rich soil, and under-laid, within twenty feet of the surface, everywhere, with a gravel bed, which gives it a natural drainage. All of the hilly portion, comprising about one-third of the county, is well adapted to fruit-growing; yet little fruit has been raised, for want of facilities for marketing; this portion of the county being too far from Cairo to market with a team and wagon, and having no convenient access to a railroad, the only available point for any part of this fruit district being Villa Ridge, on the Illinois Central. A few seedling apple trees, planted twenty years ago, though neglected, are still in a healthy, fruitful condition.

There are no commercial orchards in the county.

At Cairo nearly all the cultivated varieties of fruit trees, vines, and shrubs have been planted, and flourish remarkably well. The growth in

this wash-soil is twice or three times as great as that of the same varieties in any other part of the State with which I am acquainted.

To illustrate the vigor and productiveness of plants in this soil, I will state that I have seen seventy-five pounds of grapes, grown on a single vine, the second year after planting, and apparently without injury to the vine. The kinds of grapes which have rotted more or less, here, are Creveling, Rogers' No. 4, Concord, Hartford, and Rogers' No. 15.

The following have resisted or escaped the rot, viz: Delaware, Diana, Rogers' No. 1, Herbemont, Norton's Virginia, Iona, and Martha.

No Pear trees have been known to blight in this county, though they have been quite extensively planted by amateurs at Cairo. A few have died by what is known as root-rot.

Peaches do remarkably well at Cairo, where they escaped the hard freeze of last April, owing, probably, to the influence of the Mississippi and Ohio rivers.

Small Fruits (except currants) do remarkably well every where on the tillable lands of the county.

Should the projected railroad from Cairo to St. Louis be built soon, I predict that the northern part of this county will settle up rapidly with fruit growers, and become one of the most desirable places in the State for fruit raising.

Yours truly, E. J. Ayres.

LA SALLE COUNTY.

BY E. C. HATHAWAY.

The apple crop the past season was larger than ever before known in this county, but owing to the ravages of the Codling Moth, the crop was of but little value; the most of it finding its way to the stock pen, or vinegar barrel, or what is worse, remaining on the ground to rot, thereby insuring an almost certain crop of the moth or apple worm for another year's depredations. What apples were gathered in fall, for winter use, are not keeping well; but are rapidly going by the board with rot, with two notable exceptions, the Little Romanite and Rawles' Janet.

Pears were a failure in this section the past season.

Cherries--A fair crop, except Common Morello, of which there were none.

Small Fruits gave promise, early, of being a large crop, but were almost destroyed by heat, except in a few instances, where they were heavily mulched or shaded.

Vegetables—Poor, until quite late in the summer, when the rains came upon them, and they recuperated almost as if by magic, yielding a bountiful harvest.

APPLES.

The first orchards south of the Illinois River, were set in 1833 or 1834, by Mr. Charles Brown, Esq. Suley, Mr. Slater, and Kent & Bailey. The varieties were mostly Large and Small Romanite, Rambo, and

several other varieties, the names of which were not known. These trees were mostly set on the south side of the timber bordering the Vermillion river, and are still alive and apparently healthy.

In 1837, Curtis and Sons, of Edgar Co., came through this county south of the river, with a covered wagon loaded with trees, drawn by oxen. These trees were from two and a half to four feet in height. That wagon contained, what are now the old orchards in the southern part of this county, and traces of them can be found from the extreme west to east limits of the county. The varieties were largely Milam and and Rawles' Janet, with several varieties not known to farmers; some good, others not. In winter of 1855–56, the Milams were mostly killed, though many still survive, but are feeble from the injuries then received. They have proved very productive and profitable.

Mr. Hoag set several hundred trees on river bottom opposite Marseilles, about 1845. The varieties were principally Yellow Bellflower, Rawles' Janet, Rambo, R. I. Greening, Tolman's Sweet, Domine, and others; trees apparently healthy and productive, but have, of late years, suffered much from neglect. Samuel R. Lewis, in 1844, set 50 trees of Large Romanite and Yellow Bellflower—nearly all killed in winter of 1855–56. In 1856 he set an orchard of 100 trees, Hubbells, Winesap, R. Janet, etc., all doing well; the Hubbells are remarkably productive, and are what he considers the finest apple he has any knowledge of. The above orchard is on the south bluff of river, south of timber belt.

Geo. H. Rugg set an orchard 1852, south of Illinois river, on what was originally timber bordering the prairie. The trees (200) were obtained near Toledo. Varieties: Baldwin, Esopus Spitzenburg, Belmont, Yellow Bellflower, Rox. Russet, R. I. Greening, Rambo, Mayflower, Autumn Strawberry, Fallenwalder, Sweet June, Winesap, and many others. He has had the most decided successes with the apple called the Mayflower, considering its qualities as a good grower, healthiness of tree and its productiveness.

The fruit is about the size and color of the Domine, but not quite as flat; better flavored but not quite as late a keeper. Russets and Greenings nearly all killed in winter of 1855–56. He has since added to his orchard 300 to 400 trees, all of leading varieties, which have done well. The premises upon which these orchards stand, passed out of his possession four or five years ago, since which time they have been very much neglected, and now appear very much in want of spade, scraper, and pruning knife. O. O. Wakefield, in 1852, set an orchard of 200 trees, principally Domine, Yellow Bellflower, Winesap, Willow Twig, and Jonathan. This orchard has done well; is situated on a prairie knoll; no protection. His Yellow Bellflower proving very unproductive, he had them grafted with Domine, which now yield very large annual crops of fine fruit; the other varieties are quite productive, especially Willow Twig.

D. S. Ebersol has 200 trees set in 1854. Varieties: Baldwin, Rambo, Yellow Bellflower, Harper's Sweeting, Dutch Mignonne, Pennock, Gilpin, Rawles' Janet, Early Joe, Early Harvest, Red Astrachan, and others.

Trees all vigorous and healthy, except Baldwin, which is troubled with canker spots, and seems to be generally unhealthy, with him. Red Astrachan is very productive. Rambo, American Summer Pearmain, and Domine do well. Soil: black loam, sub-soil drift, southwest exposure—no protection.

The foregoing are all the orchards on the south side of the Illinois River, which I will make mention of, although there are many as large or larger, dotting the prairie over here and there; and to-day almost every quarter section contains its dozens, fifties, or hundreds of apple trees, growing more or less thriftily, and are more or less productive, according to variety, soil, and cultivation.

North of the Illinois River, north of Utica, I find an orchard set by Truman Hardy, on open prairie, with no protection, containing about 500 trees, most of which were set in 1848. The varieties are principally Rawles' Janet, Domine, Little Romanite, Pennock, Red Astrachan, Rhode Island Greening, Winesap, Yellow Bellflower, Northern Spy, Newtown Pippin, Early Harvest, and many other varieties. Many of these trees have been set since the first plantings, and are of later and newer varieties; names unknown to the occupants, no records having been kept of the same. Many of the old trees have been grafted over, especially the unproductive sorts, such as Yellow Bellflower. This orchard, a few years ago, was in a vigorous, thrifty, and productive condition; but bark-lice, borers, and more especially *neglect*, are fast decimating it.

In another orchard I found many trees of the American Summer Pearmain, which, though much neglected, were annually producing large crops of fine fruit.

North of Ottawa, in the town of Dayton, I find a large orchard containing thirty-five acres, set in 1844, by Col. Wells Wait, who at that time had also a nursery there, from which the trees were obtained for planting many of the older orchards in the northern part of the county. This orchard stands on rather high ground, on open prairie, without protection, and has been quite neglected, yet the larger portion, say three-quarters of the original planting, are alive and doing quite well now. Neglect, bark-lice, and borers seem to be its chief troubles. The varieties are about the same as mentioned in orchards spoken of before. Of these, the present proprietor informs me that he regards, as best for all purposes, Domine, Rawles' Janet, Winesap. Fall Pippin, Winter Pippin, Rox. Russet, Snow (Fameuse), Large and Small Romanite.

In response to inquiries made of Martin Allen, of Mendota, I received the following reply, which I have condensed somewhat from original:

"In 1833, J. and P. Dewey (father and son), settled on north side of Troy Grove. They came from Ohio; brought with them apple seeds (*from good sorts*), which they planted. Next spring got 100 trees from Peoria, which were sent out the year before from Ohio. There were thirteen sorts in the lot; some wrongly labeled and others not known. In 1836, fifty more grafted trees were obtained. Of these plantings, strange to say, Early Pennock and Winter Pennock, three of each, are yet standing and doing well; while the Red Romanites are all gone. All the Rambos

yet doing well. Of the sorts that are known—Domine, Early Pennock, Rawles' Janet, and Sweet Vandevere have been the best and most profitable. Soil, deep, rich prairie loam; trees set twenty-five feet apart, protected by timber on the south. The trees from seed, before named, produced some fair fruit, but none worth propagating.

In 1837, R. H. Wixom bought twenty-four stock-grafted trees from a peddler from the Wabash country; planted them sixteen feet apart, on soil not so deep or rich as Mr. Dewey's. They were protected by timber on the southeast. Maiden's Blush has done well; Yellow Bellflower, never borne much. I think four, bought for Rhode Island Greenings, are Willow Twig; three of them yet standing. Two out of three Rambos yet remain, and have done the best of any in the lot. Mr. Wixom, at the time of planting the above orchard, also obtained seed from cider press, which he planted, raising trees from which he set an orchard, which has produced fruit only fit for cider.

In the spring of 1846, S. J. Haight set 200 trees, obtained from Curtis' nursery in Edgar County. Fifty trees of Milam, which he obtained under the name of Red Winter Pearmain, he says have been worth double all of the balance, except Maiden's Blush, of which he has ten trees. These have done *very* well. Tolman's Sweet and Sweet June have been satisfactory, also White Winter Pearmain. The latter is liable to scab. Sweet Bough, together with ten other sorts all failed in the winter of 1855–56. About 175 of the trees yet remain, and are in fair condition. The above favorably-mentioned sorts are all he considers worthy of notice in the lot. This orchard was planted on soil medium between prairie and timber, at southeast corner of Four-Mile Grove.

In the last few years we have had home nurseries of the most approved sorts of fruits; since which the plantings of Apple and Early Richmond Cherry trees, have become quite general, 2,000 apple and 600 cherry being the largest individual risk I know of here."

Mr. Baldwin, northwest of Ottawa, set an orchard of 300 trees in 1847; could get no further information respecting it, than that the trees were apparently healthy and quite productive. They were set on timber land; some protection on north and east.

Wm. Galvin, who has an orchard near the last-named, speaks highly of the Early Red Margaret, on account of its great productiveness.

In 1852 Nathan Hardy set 300 trees of Domine, Large and Small Romanite, Westfield Seek-no-further, Autumn Strawberry, Rox. Russet, M. Blush, and Early Harvest. The orchard looks neglected, some trees having been killed by borers. Mr. Hardy speaks highly of M. Blush and Seek-no-further. These trees are set on the north side of the timber belt on the bluff.

In 1845 Jonathan Massey set three acres, consisting of Early Harvest, Early Sweet Bough, Barnhill Summer, Milam, Eng. Golden Russet, Domine, R. I. Greening, Bellflower, and Tolman Sweet. This orchard is on the prairie, with no protection; southern exposure; trees all healthy and vigorous.

D. L. Carpenter, at Seneca, has fifteen acres planted twelve years ago, upon the Illinois river bottom, and protected on the northwest, north, and northeast by high bluffs and timber. The trees are generally healthy, when exempt from borers. The Varieties are Early Harvest, Sweet Bough, Red June. M. Blush, Snow, Hawley, N. Spy, Jonathan, R. Janet, Flushing Spitzenburg, Westfield, Seek-no-further, Belmont, Gilpin, Tolman Sweet, Eng. Golden Russet, Domine, Milam, Limber Twig,

American Summer Pearmain, and Bellflower. All are fair to good bearers, except Early Harvest, Sweet Bough, Tolman Sweet, Hawley, and Yellow Bellflower. Belmont scabs badly, and Red June is too small.

N. C. Wickwire, at Manlius, set ten acres in 1855, on prairie soil, yellow clay sub-soil, well drained, no protection, northwest exposure; trees healthy and vigorous; varieties same as mentioned above, with addition of Autumn Strawberry; some good and some poor bearers.

Mrs. Ann Rolph in 1855, set three acres; soil same as Wickwire's. The trees are healthy and vigorous; varieties: Sweet Bough, American Summer Pearmain, Lowell, Domine, Milam, Jersey Sweet, Tolman Sweet, N. Spy, R. I. Greening, Swaar, Baldwin, Holland Pippin, Vandevere, Eng. Golden Russet, Westfield Seek-no-further, Flushing Spitzenburg, Pomme Grise. All fair to good bearers, except Sweet Bough, Early Harvest, Swaar, Vandevere, and Tolman Sweet. The Baldwin and Holland Pippin trees are troubled with canker spots.

S. Hutchinson and the Messrs. Forbes have planted upon high prairie knolls, four miles north of Seneca, about seventy acres of apple orchards, embracing a large number of varieties. These orchards have been planted at various times from 1856 to 1867. The soil consists of black, prairie loam, generally well surface-drained. There is no protection.

The *leading* varieties are Duchess of Oldenburg, Red Astrachan, Maiden's Blush, Snow, Autumn Strawberry, Jonathan, Winesap, Minkler, Gilpin, Willow Twig, Ben Davis, Perry Russet, Grimes' Golden Pippin, Cole's Quince, Rawles' Janet, White Pippin, Red June, Wagoner, Sweet June, and Bailey's Sweet.

North of Seneca, skirting the timber, I find an old orchard, planted about 1840. This orchard, owned by Geo. Bosworth, stands on the east side of a fine grove of young timber, which gives it complete shelter from the west and southwest winds. It has received excellent care; trees very healthy, vigorous, and productive. I attribute the cause of this to the extraordinary good care taken of them, together with protection from southwest winds.

On the premises now owned by the writer, but formerly occupied, in part, by Norris & Murphy's Ottawa Nurseries, stand about two hundred trees, set about 1850. The varieties are, principally: Early Harvest, American Summer Pearmain, Sweet Bough, Yellow Bellflower, Rox, Russet, Maiden's Blush, Spitzenburg, Westfield Seek-no-further, Tolman Sweet, Red-cheek Pippin, Hubbell, Porter, Autumn Strawberry, R. Janet, Domine, Baldwin, Keswick Codlin, Pound Royal, and others. All are fair bearers except Yellow Bellflower, which is worthless. The Hubbell, R. Janet, American Summer Pearmain, Maiden's Blush, and Seek-no-further are *very* good and annual bearers. Soil—alluvial deposit; sub-soil—drift underlaid with sandstone, givingperfect natural underdrainage. Location—bluff, bordering immediately on Illinois River.

I will make no further mention of orchards; but as before related regarding the county south of the river, so on the north, the prairie and

farms bordering the timber skirting the streams, are all more or less provided with orchards, large or small.

I will now make a few remarks, that observation and inquiry have led me to believe correct, on the different varieties of apples:

Duchess of Oldenburg—Perfectly hardy; an annual, early, and great bearer on all soils; of large, handsome fruit; quality second rate.

Red Astrachan—Neither a good nor regular bearer, except on timber land, with gravel sub-soil.

Red June—Tardy in coming into bearing; good bearer; but fruit altogether too small to be valuable in this county, especially for the market.

Cole's Quince—Spoken of very highly by Messrs. Forbes as an early bearer; perfectly hardy; good market apple.

Fameuse or Snow—Not very early bearer; good for prairie; not for light soils.

Maiden's Blush—Spoken of by some on prairie as not being perfectly hardy; the reverse the case on light soils and on the bottom lands; an early and immense annual bearer of very fine market fruit.

Rambo—Tender; not valuable.

Sweet June—Conducts itself well on the prairie; early, hardy, good bearer; good quality.

Sweet Bough—Poor bearer; tender in tree.

Hawley—Shy bearer.

Early Pennock—On prairie, the tree seems to be defective; on light soils good.

Early Harvest—Generally a poor bearer.

Wagoner—Good and very early bearer; tree moderately hardy.

Jonathan—Sufficiently hardy; an early bearer; hangs well.

Winesap—Perfectly hardy; tardy in coming into bearing, but a great bearer.

Willow Twig—Perfectly hardy; an early bearer of first-rate market fruit.

Gilpin or Little Romanite—Hardy; good and early bearer.

Domine—In north part of the county it is not spoken very well of, but in the central and southern part it is an immense bearer, alternate years, of excellent fruit, both for market and family use; tree perfectly hardy. I have found a number of trees of this variety, top-grafted on the Yellow Bellflower, that annually bear immense crops of extra fine fruit.

English Golden Russet—Good and sure bearer everywhere; tree very thrifty. Roxbury Russet, do.

Minkler—Perfectly hardy; an early and sure bearer of large, fine apples, which hang well to tree and also keep well.

Rawles' Janet—Not superior on all soils; requires cultivation, with quite severe thinning of fruit.

Ben Davis—Hardy, and good grower; very few in bearing in the county.

Gaines' Golden Pippin—Messrs. Forbes inform me that the tree appears perfectly hardy, and is remarkably vigorous in the nursery; trees two years old blossom two years from setting.

Perry Russet—Perfectly hardy; a fine grower; good fruit.

White Pippin—Moderately hardy; an early and good bearer of large apples.

Autumn Strawberry—Perfectly hardy; an annual bearer of good crops of not large, but fair, handsome apples of the best quality.

Rhode Island Greening—Does not do well.

Baldwin—Trees perfectly hardy, and most generally healthy; but tardy in coming into bearing; trees tender in nursery; on bottom soils this apple does well.

Tompkins County King—Hardy; early and good bearer; not planted much here.

Keswick Codlin—On the prairie opinions regarding it are very conflicting; some having success with it, others, not. On the bottom lands it is highly esteemed.

Fall Swaar—On prairie, good; on bottom, worthless. The same may be said in reference to Winter Swaar.

Lowell—Perfectly hardy; a very great bearer of large, first-rate fruit; superior on all soils.

Red Canada—Hardy; rather tardy in coming into bearing; good bearer of firm, first-rate apples.

Cayuga Red Streak—Has bad reputation generally, everywhere I can hear of it.

Vandevere—Same as last named.

American Summer Pearmain—Immense bearer, alternate years, of splendid fruit for market or family use; good on all soils.

Hubbell—Perfectly hardy; a great bearer of fine fruit of first-rate quality.

Westfield Seek-no-further—Does well generally; tree hardy; an annual bearer of first quality fruit, which is generally exempt from attacks of Codling Moth, as far as I have observed.

Yellow Bellflower—Unproductive, except in a very few instances, on very heavy clay soil.

Other varieties I might mention, but must forbear, lest I task your patience beyond endurance.

There are many conflicting opinions respecting soils, situations, protection, etc., all sorts and conditions of each having their advocates as to their being the best suited for orchard purposes; concerning which opin-

ions I will not open any discussion, but merely remark that I find the greatest success among those who *cultivate and feed their trees the most thoroughly.*

PEARS.

I find but few trees of any varieties living, although thousands of them have been planted in this county. Most of the older trees have either died from blight or neglect. Almost every farm has its few pear trees, but the owners keep no record of them, and know but little about them.

About the towns I find some small orchards, mostly dwarf trees; varieties principally Louise Bonne de Jersey, Duchess d'Angouleme, Vicar of Winkfield, Bartlett, Beurre Diel, Beurre d'Anjou, Seckel, and others. The Louise Bonne de Jersey, by all odds, does the best (as dwarf), and is of good quality of fruit, also.

Geo. H. Rugg, of Ottawa, has about 450 trees, very few in bearing yet.

I have on my place about 200 trees, old and young, both dwarf and standard, including many varieties. All do well, except White Doyenne, which cracks badly some years. The past season it was very fine. I have but very little blight.

Early Richmond Cherry, also Large English Morello and Belle Magnifique, do very well here, bearing heavy annual crops. May Duke does moderately well; other varieties are not much known. Of the sweet varieties, very few, if any, of the trees can be found; the trees of this class all having been swept away by the cold winter of 1855–6, since which time none have risked planting them.

There are now being planted in this county many orchards containing from 50 to 500 trees, principally E. Richmond. My own trees are nearly all on Mahaleb stock, which experience has taught me to be preferable to the Morello on our light, bottom soils; but for the prairie, in heavy, black soil or clay, would rather have trees on Morello stock. With me I can see no difference in bearing, on account of the stock, but if there is any, consider it is in favor of the Mahaleb.

There are a great many *Plum* trees scattered over the county. The varieties are principally Magnum Bonum, Smith's Orleans, Coe's Golden Drop, all of the Gages, Yellow and Purple Egg, and others, which annually set fine crops of fruit, but which nearly all fail to mature, and drop from the tree on account of attacks by the curculio. It seems a pity that the fruit which seems to be the surest here, and would never fail otherwise, should be lost in this manner; but the people are getting awake to the idea of combating the "Little Turk," which they can now do without fear of defeat, by the use of the "catcher," invented by Dr. Hull.

Peaches are not grown to any extent of late years, as the cold winter before mentioned destroyed all the trees (which were many) at that time, since which, no one has had faith enough in them to plant.

Grapes do remarkably well here, both upon the broad, open prairie, and upon our sheltered river-bottoms. There are a number of old vine-

yards of Catawba, Isabella, and Clinton, of a few hundred vines each, along the Illinois River, which, in years past, have done very well when well drained and cultivated thoroughly; but of late years most of them have suffered neglect, and have become diseased. Very many grape roots have been planted, within a few years, all through the county, and very many quite large vineyards have sprung up. I find the Concord to be the *one great grape* of them all, although the Delaware does finely on the prairie and bluffs, but is almost worthless on the bottom.

The vineyards with which I am acquainted, consist, principally, of Concord, Delaware, Diana, Ives', Hartford Prolific, Perkins, Isabella; with a few Catawba and Clinton; also a few of the newer varieties, as Martha, Eumelan, Walter, Salem, Rogers' and Arnold's Hybrids, and others. Almost all seem to do well in whatever soil they are placed, and yield generous returns to the cultivator.

Small Fruits all seem to be perfectly at home here. Of Raspberries, Doolittle and Golden Cap are the best. The Kittatinny Blackberry has done moderately well, while other varieties winter-kill, except Missouri Mammoth, which is good neither to bear fruit or anything else. Strawberries, Currants, Gooseberries, and other small fruits, yield abundant returns.

CLAY COUNTY.

BY C. H. MURRAY.

CLAY CITY, ILL., Dec. 15, 1870.

Mr. O. B. GALUSHA, *Secretary of State Horticultural Society:*

Dear Sir:—In reply to the request you make of me to give some account of the first orchards planted in Clay County, I have the honor to report as follows:

This information, as far as I have been able to get it this year, attaches chiefly to the southern part of our county. In 1838, Aaron Smith, who then resided in the southern part of our county, began a nursery of apple trees. Two years later, Aaron O. Finch, his neighbor, also planted a nursery of apple. From these two efforts nearly all the old trees of this county were derived. Their fate, as far as I have been able to learn, has been quite similar under like circumstances. The orchard of Mr. Finch merits a detailed statement.

He planted the seed in 1840, and in the spring of 1843 he set out fifty trees, and the following fall, fifty more along side of those, on like soil. The orchard was set two rods apart each way in quadrangular style. The entire orchard always received the same culture, yet notwithstanding this, the half set in the spring rapidly out-grew the other, and the difference at this date between the two parts of the orchard is so remarkably in favor of the spring-set, that a person would have no hesitation in saying that they had been planted ten years earlier.

This orchard of 100 trees always received from Mr. Finch, during his lifetime, the greatest care and supervision. It was kept in a fine state of

cultivation; the trees were frequently washed with caustic solutions; the bark was kept smooth and healthy, and borers and all other insect pests were perseveringly dealt with. The result has been that the trees have made a most astonishing growth, many of the spring-set being now from 16 to 18 inches in diameter, with very heavy tops, and the largest trees now look to be perfectly healthy. The bark is almost as smooth and fresh as on a young tree, and the active growth of the tree seems uninterrupted. The location of this orchard is on a slope declining to the south. Every part of it is naturally well drained. It is protected by woods on the west, southwest, and south. The varieties were, originally, Pound Pippins, 5; Yellow Bellflowers, 5; Summer Queens, 5; a few nameless ones, and the rest (the largest number of the orchard), the Vandevere. A very few of these trees were grafted on the stock at the ground. The balance were budded from one to four feet high. The present proprietor, Mr. J. R. Finch, tells me he can see no difference between the budded and grafted ones in respect to hardiness or other qualities.

Now as to results: This orchard that appears so vigorous and healthy is almost *worthless*. Last year it had at least one thousand bushels of apples on, and the proprietor did not get a bushel of winter apples. The bitter-rot blasts them like the breath of ruin, and the promise of spring ends in disappointment and decay. Many experiments have been tried to arrest this evil, but so far none of them have proved efficacious. Trees have been trimmed and thinned; holes have been bored into their trunks, and sulphate of copper, iron filings, salt, sulphur, etc., have been plugged up in the wood. Squire Finch tells me that this orchard was in its prime from the time it was 8 until 18 or 19 years old. For ten or eleven years it gave the most bounteous returns, and produced wagon loads of the finest fruit. It then began to decline. The fruit commenced to speck and the evil increased until the trees are little more than an encumbrance on the ground. The hogs have been kept in this orchard for a long time. Pens have been made under some of the trees and the hogs fed there to try the effect. It has done no good in preventing the rot. The Vandeveres all have the "bitter-rot;" also, the Bellflowers; but the Pippin and Summer Queen have not, he thinks, been attacked with bitter-rot; but they have a sweet or summer-rot.

In contrast to this I wish to give a short account of an orchard in the same vicinity set about the same time, but which received very different treatment. Nearly as soon as set it was seeded down to timothy and kept in sod for *ten years*. The consequence was that it was so stunted that it scarcely grew at all. The trees just made out to live. After this the ground was broken up and thoroughly cultivated. The trees began to grow and are at this time thrifty and fruitful, and so far the fruit does not rot. I do not cite this case to recommend this treatment, for doubtles after these trees have arrived at a *certain stage of growth*, their fruit will also rot.

The experience with the apple, in this county, may be summed up as follows: The trees are in their prime from eight to twenty years after setting. After twenty years they begin to decline. If the trees keep

growing, the fruit rots. In many orchards, after twenty-two or twenty-three years, many of the trees, from some unknown cause, die. No orchard, and no known tree of thirty years' growth, provided it has had reasonable cultivation, produces healthy fruit after that age.

The soil in our county is varied. The swells and hills are generally a warm friable clay, containing considerable oxide of iron, as indicated by a strong reddish color. The more level lands, in many localities, have a whitish appearance, and are composed of soil in a state of very fine comminution. The former appears to be the best adapted to fruit of any kind, and on it young apple orchards are very fruitful and healthy. We produce some magnificent fruit, not to be excelled anywhere in the country, either in color, size, or flavor. The Ben Davis or New York Pippin thrives here, and is of much better *quality* than is customary with that apple. The Yellow Bellflower, although I observe you have dropped it from the list of reliable apples, does handsomely here with us, and young trees bear heavy crops of splendid specimens. The Rome Beauty also is superior.

LIVINGSTON COUNTY.

BY L. BANCROFT.

The oldest orchards in this county that I know, are two of seedling apples, planted in the year 1832 by Uriah Blue and Garret Blue.

Uriah Blue planted thirty trees in the town of Owego, in timber land, protected by timber on the south and southwest. In 1833 this orchard passed into the possession of David Rockwood.

In 1835 Mr. R. planted fifty trees of grafted fruit of several varieties. Among them were Domine, Greening, and Rambo. The ground was well cultivated; they came into bearing quite young, and most of them proved to be annual bearers of good fruit. In 1854 he gathered fifteen bushels of large, fine fruit from each of his Greening trees. In the terribly cold winter of 1855–56 nearly all of his grafted trees split from the ground to the limbs, leaving a few trees of the Domine and Rambo, which still remain standing, and produce moderate crops of apples.

Of the fifty planted by Mr. Blue, forty remain, and produce good crops every second year of rather an inferior quality. He continued to plant, and fill vacancies with seedlings, thinking it of no use to plant grafts. He thinks that protection on the south and southwest is necessary.

In 1834 Garret Blue planted 200 seedling apple trees, in the town of Pontiac, on timber land, surrounded on all sides by belts of timber. Nearly all of the trees lived and grew well, and came into bearing in eight or nine years.

The ground was planted to corn annually, until the trees came into bearing, when it was seeded to grass and pastured. In 1850 it passed into the possession of Hiram Young. Mr. Y. says the orchard has borne regularly, and that the most of the fruit is as good as grafted fruit,

and that timber land is absolutely necessary for the annual production of remunerative crops of apples.

Dr. C. B. Ostrander, of Avoca, has about 200 trees entirely surrounded by a high Osage orange hedge, planted in 1857 and 1858, which he reports as being very productive. His most approved varieties are Smith's Cider, Rawles' Janet, Northern Spy, Domine, Winesap, and Jonathan; productive in alternate years. Smith's Cider is the most valuable; Rawles' Janet and Northern Spy are No. 1; Domine is a good bearer, but not always salable; Winesap proves a shy bearer, and Jonathan fails to keep well.

Robert Smith, of Owego, Samuel Garner, of Epperd's Point, and C. M. Bennet, of Pontiac, have orchards planted in 1857 and 1858, in all 1,700 trees, all on prairie soil, and unprotected. They commenced bearing in six or eight years.

The following varieties prove to be annual bearers, viz: Greening, Baldwin, Red Astrachan, Snow, Minkler, Winesap, Milam, Fall Pippin, and Red and Sweet Junes.

Mr. Garner has two orchards on sandy land; one has a sandy sub-soil, and produces light crops alternate years; the other a clay sub-soil, and produces full crops every year.

C. N. Bennet recommends the Early Harvest, Red Astrachan, Keswick Codlin, Snow, Minkler, Hubbardston Nonsuch, and Swaar, as being the most productive with him.

With regard to the relative value of prairie and timber soil, I am inclined to agree with Messrs. Young and Blue, that timber land, or that of a similar nature, sand and clay is absolutely necessary to produce annually remunerative crops of fruit; and protection on the south and southwest sides is at least desirable, if not necessary. I know that orchards, unprotected, occasionally produce good crops. On timber soil, protected by belts of timber, most of the varieties with which I am acquainted will produce annually paying crops.

I would say, plant shallow; keep the roots near the surface; cultivate thoroughly, not deeply, until your trees shall attain bearing age; then I would not seed to grass, but let the orchard grow up to weeds, and at the time of gathering fruit, if they are in the way, roll or drag them down to mulch and finally decay and enrich the land.

Accompanying the above report was a letter from Mr. Amos Edwards, of Amity, Livingston county, containing the following valuable suggestions, as the result of his thirty years' experience and observations: He recommends shading the southwest and south sides of the trunks of tender varieties of apple trees with boards, until the branches extend sufficiently to afford a partial protection from the rays of the sun. This prevents the injuries so often seen upon the southwest sides of the exposed bodies of trees.

He practices covering the ground under his trees with a thick coating of straw, in the spring, as far as the spread of the branches. This has the three-fold effect of affording a mulch, keeping the ground cool and moist, making a soft bed for the apples to fall upon when gathering, and

enriching the land when it decays. He finds this practice gives him larger and fairer fruit than when it is neglected. This letter closes with this sensible remark: "I believe it is too miserly to rob the orchard of its own rights by raising crops of grain or grass in it, and removing them."

PULASKI COUNTY.

BY JAMES H. CRAIN.

The people of Southern Illinois, in common with those of other portions of our country, having a high average temperature, and also a deep, rich soil, experience difficulties in the production of apples which, with ordinary care, will keep through the winter season.

This applies to our position with marked force, as we occupy the extreme northern of the isothermal, or heat-line east of the Rocky Mountains, and our soil to quite a depth is of sandy loam, largely admixed with decomposed organic matter.

Unfortunately, circumstances connected with the early settlement of this country brought here varieties of apples from localities having quite opposite conditions; varieties which were at home in—and which would uniformly ripen in—short seasons of low average temperature, where the soluble matter present in the soil is far less abundant than in ours. Consequently, nearly all the orchards planted here anterior to 1860 have proven disastrous failures, so far as the production of winter apples is concerned. Indeed, they do not serve well for autumn use, as they evidently require the restraining influences of cold, or some analogous preservative, the moment they attain full growth. Without apprehending the cause of this uniform failure, our people had at one time almost despaired of success with winter apples of fine texture and appearance; but coming gradually to note a few examples of success with native seedlings, and with varieties satisfactorily tested in similar or more southern localities, they were led to extended research in that direction, and to-day we can boast of assured success with the apple in all its seasons of development. It is true there are those who still cling to the old northern and eastern favorites, regarding them as desirable in consequence of peculiarities of flavor, and hoping yet to succeed with them by destroying the curculio.

Without doubt the curculio hastens the decay of many tender kinds, old as well as new; still this does not affect the general proposition, that no apple which completes its growth before the approach of frost, can anywhere be successfully grown as a winter fruit, except upon the theory of substituting other than ordinary preservative measures. How far such extraordinary means can be made available remains for the future to prove, there having been but little effort in that direction as yet. Some trials made with saw-dust, finely-powdered charcoal, sand, and earth, point strongly towards success, and promise to work a revolution in the handling of all apples in all climates; but, however successful, they can not justify planting the kinds accustomed to a short summer season, in localities having long ones. It is true that among the old kinds there are

those very desirable, in consequence of appearance, texture of flesh, and agreeableness of flavor; but among the new varieties there are many with all these qualities combined in a rare degree.

Although our people may confidently hope to make the growing of winter varieties profitable for shipment to Southern markets on the Mississippi River, yet it is unquestionably true that the production of the extremely early sorts must always preponderate in orchards near favoring lines of transportation northward. This is made more apparent by noting that all early varieties do well with us. The prevalence of readily soluble elements in our soil, with warmth and mixture conjoined, bring them to maturity, to meet the want of our northern neighbors, who are in the main a fruit-consuming people. Add to this the fact that the immense region north of us is filling up rapidly with population and wealth. Those who contemplate planting trees here will have before them a sketch of the obstacles already surmounted, together with those yet to be met; a history of how progress thus far, has been made, and hints of the rewards of future labors.

HAMILTON COUNTY.

BY HOSEA VISE.

The first orchards, about fifteen in number, were planted in the years 1818 to 1820, and consisted principally of seedling trees. Each orchard, however, contained a few grafted trees, the varieties in which were mainly the following:

Summer and Fall Apples—Yellow June, and an apple called here the "Bunch Apple," Horse Apple, Seek-no-further, and Winesap.

The most durable *Winter* varieties are Green Geneting, Pearmain, Limber Twig, New York Pippin, and Roman Stem. The Rambo bears well for a few years, but soon dies. Orchards do best here on timber soil. Trees grow more thriftily, grow larger, and bear better crops.

Grapes have not been cultivated to any considerable extent in the county, though they prosper well where they have been tried.

This county is well adapted to the culture of *Peaches*. There are large localities here where they never fail, but the distance we are from market renders the raising of peaches unprofitable, to sell in the fresh state. When dried they bring remunerative prices.

The small fruits do well here when properly attended to.

There is probably no county in the State better adapted to fruit raising than Hamilton County. At present it is nearly all dried before marketing.

Our markets are Du Quoin, Tamaroa, and Ashley; towns on the Illinois Central Railroad, thirty-five to forty miles distant.

WILLIAMSON COUNTY.

BY WM. P. WHITE.

The first few orchards planted in this county, from fifty to seventy-five years ago, were seedlings, from apples grown in the States of Tennessee

and Kentucky; some of which are still standing. The introduction of grafted trees is of comparatively recent date. The principal part of the grafted trees first introduced, are still in good bearing condition.

The varieties are mostly Limber Twig, Rawles' Janet, Summer Pearmain, Horse Apple, Hall's Seedling, Islem, Pennock, Smoky Twig, Winesap, and a few Ben Davis. These earlier grafted orchards were small and turned to no account, except for family use. The orchard, as a source of profit, was scarcely thought of twenty years ago by any of our people, the market for green fruits being inaccessible until the Illinois Central railroad was built; but since that time the enlarging and planting of orchards has been wonderful. The orchardists of the county have, however, sustained a great loss, and disappointment, too, by planting Eastern and Northern varieties with the expectation of producing good winter fruits, superior in size and flavor to our original sorts. I suppose that about fifty thousand trees were set between the dates of 1850 and 1860, the principal part of which are still in bearing, but are almost worthless. The change in climate did not affect the quality of the fruits, as I can see, but it has changed the season of its ripening. Such varieties as Tompkins County King, Northern Spy, Rhode Island Greening, ripen and drop their fruit in August or September, and are, consequently, almost worthless here as market fruit, except they can be marketed in the summer season.

The soil and situation of Williamson County are adapted to the growing of all kinds of fruit that can be grown successfully in this latitude. The land is generally high; the forest growth is composed of oak, poplar, walnut, dogwood, and hickory; the soil is a little sandy, with a pale-red clayey, and somewhat porous sub-soil. Apples, peaches, pears, cherries, plums, grapes, and strawberries do well on our soil, no drainage being necessary.

Our market has been growing better for several years. Speculators have been buying fruit and shipping it to Chicago.

In the year 1868 the apple crop of the county was a very full one, and dealers in fruit paid, at Carbondale, an average of about seventy-five cents per bushel. In my opinion the apple crop of that year brought more money into the county than the wheat crop of the same year.

The most popular varieties now grown in the county are Limber Twig, Rawles' Janet, Earley Harvest, Maiden's Blush, Pennock, Summer Pearmain, Horse, Hall's Little Seedling, Islem, Smoky Twig, Smith's Cider, Winesap, Ben Davis, Yellow Bellflower, and Summer Queen. These varieties are all hardy in tree and fruit except perhaps the Rawles' Janet, which will not live long on wet land; while the Limber Twig will thrive on the borders of a swamp, and is not subject to any disease. I do not remember to have seen a blighted limb on a Limber Twig tree.

Pears—The quantity of pear trees in the county is quite limited, and confined to door-yards and gardens; are more subject to blight than apples. Dwarfs soon die, after coming into bearing, from want of sufficient roots to support fruit and foliage. They can be saved by raising the

earth around the tree so as to induce the trunk to put forth roots above coition. The most hardy variety we have is the Bartlett. Standards of it are generally preferable, as they come into bearing sooner than most varieties.

The *Peach* is very abundant, and succeeds best on our highest northern slopes. The cultivation of this fruit has not been very remunerative so far, for the want of a railroad.

The best soil for the peach is a loose, lively loam, with a tough, red sub-soil. An occasional dressing around the roots with wood ashes, to stimulate the trees and keep out the borers, allowing the hogs to devour all the fallen fruit, is about all that is necessary for the good of both tree and fruit. Swine, in eating up the prematurely-fallen fruit, eat up with it the larvæ of the curculio. One hog in a peach orchard is worth more than a man with sheet and bumper. Heath Cling is our best peach.

Grapes—But little attention has been paid to vine culture until within a very few years. Preparations are being made now, however, to grow grapes to a considerable extent. Several vineyards have been planted within the last few years for the production of wine, succeeding well. The Concord is claimed to be the hardiest of all the varieties that have been thoroughly tested. We believe the Herbemont will prove to be very hardy. I am giving it a fair trial. I produced about twenty-five pounds of them the past season on a two-year old vine, grafted on the wild stock, notwithstanding this was the worst season for grapes we have had for years.

Cherries, plums, and strawberries are abundant. Wilson is considered the best shipping strawberry.

[EXPLANATION—Owing to delay caused by the burning of the State Bindery at Springfield, the report of the State Entomologist has not been received for publication in this volume.—SECRETARY.]

TABLES OF

FRUITS, FLOWERS, TREES, ETC.

RECOMMENDED BY THE

Illinois State Horticultural Society.

LATEST REVISION;

MADE AT THE

Annual Meeting at Ottawa, December, 1869.

N—Northern, C—Central, and S—Southern Illinois. Numerals—The number of Horticultural Districts. 1 and 2—Northern; 3 and 4—Central; 5, 6, and 7—Southern Illinois.

Recommendations of Fruit made by the Society are: m—market; f—family use; c—cider; b—baking, and *trial*. a—denotes for special locatities.

Recommendations of Fruit made by individuals are denoted by a star (*).

Recommendations of Trees, etc., made by the Society are marked with a double star (**). Those made by individuals with one star (*).

The arrangement is in the botanical order according to Gray's "Forest, Field, and Garden Botany."

☞ The figures, upon the left and right-hand margins, will aid the reader in tracing the line of any variety.

No.	NAMES.	DISTRICTS. N. 1	2	C. 3	4	S. 5	6	7	Origin.	Use.	PECULIARITIES. Class, Etc.	Hei't or Shape
	CROWFOOT FAMILY.											
	CLEMATIS.								Asia, etc..	orn	climber	
	Patens								Japan	orn	climber	
	Cærulea (*Blue*)			*	*				Japan	orn	climber	
	Grandiflora (*Large Fl.*)					*	*	*	Japan	orn	climber	
	Virginiana (*Common Wild*)	*	*	*	*	*	*	*	America...	orn	climber	20 feet
	ANEMONE (*Wind Flower*).									orn	erect herbs.	
	Hortensis	**	**	**	**	**	**	**	S. Europe.	orn	tuberous	
	Coronaria	**	**	**	**	**	**	**	S. Europe.	orn	tuberous	
	DELPHINIUM (*Larkspur*)	**	**	**	**	**	**	**		orn	annual, etc.	
	PÆONIA (PÆONY)									orn	herbs, etc.	
	Officinalis (*Common*)	**	**	**	**	**	**	**	Old World	orn	herb	
	Peregrina								Europe	orn	herb	
	Albiflora (*Chinese*)					*	*	*		orn	herb	3 feet
	Moutan (*China*)	*	*	*					China	orn	shrubby	3 feet
	MAGNOLIA FAMILY.										tr's&shrubs	
	LIRIODENDRON.											
	Tulipifera (*Tulip Tree*)	*	*	*	*	*	*	*	America ..	or. tim.	tree	100 feet
	MAGNOLIA.											
	Grandiflora (*Great Flowered*)					*	*	*	South	orn	tree	80 feet
	Glauca (*Sweet Bay*)			*	*				America ..	orn	shrub	15 feet
	Acuminata (*Cucumber*)	*	*	*	*	*	*	*	America ..	orn	tree	80 feet
	Macrophylla (*Great Leaved*)					*	*	*	America ..	orn	small tree	15—30 feet
	Umbrella			*	*				America ..	orn	tree	30 feet
	Conspicua (*Yulan*)			*	*				China	orn	small tree	15—20 feet
	Purpurea (*Purple*)					*	*	*	Japan	orn	shrub	
	CUSTARD-APPLE FAMY.											
	ASIMINA.											
	Triloba (*Papaw*)	*	*	*	*	*	*	*	America ..	or. fruit.	small tree	15—20 feet
	BARBERRY FAMILY.											
	BERBERIS.											
	Vulgaris (*Common*)	*	*	*	*	*	*	*	Europe	or. fruit.	shrub	
	Aquifolium (*Mahonia*)			*	*	*	*	*	Oregon	orn	shrub	3—4 feet.
	WATER-LILY FAMILY.										perennial	
	NYMPHÆA.											
	Odorata (*Sweet Scented*)					*	*	*	East	orn	herb	
	FUMITORY FAMILY.											
	DICENTRA.											
	Spectabilis (*Bleeding Heart*)	**	**	**	**	**	**	**	N. China	orn	perennial	
	MUSTARD FAMILY.											
	BRASSICA.									sal. etc.	herbs	
	Oleracea (*Cabbage*)								Europe		an. & bien.	
1	Early Flat Dutch	*	*	*	*							
2	Early York	*	*	*	*	*	*	*	Flanders			
3	Early Winningstadt	*	*	*	*							
4	Jersey Wakefield			*	*				N. J.			
5	American Drumhead	*	*	*	*	*	*	*				
6	Drumhead, Savoy	*	*	*	*							
7	Mason			*	*				Mass.			
8	Premium Flat Dutch (*Cauliflower.*)	*	*	*	*							
1	Early Erfurt			*	*							
2	Early Paris	*	*	*	*							
3	Half Early	*	*	*	*							
	Campestris (*Turnip*)											
1	Flat Strap-Leaved	*	*	*	*	*	*	*				
2	Purple Top Strap L'ved	*	*	*	*	*	*	*				
3	White Dutch	*	*			*	*	*				
4	Yellow Aberdeen					*	*	*				
	NASTURTIUM FAMILY.											
	NASTURTIUM.											
	Armoracia (*Horse Radish*)	*	*	*	*	*	*	*	Europe	cond.	perennial	
	RAPHANUS.											
	Sativus (*Radish*)								Europe	cond.		
1	Chinese Rose	*	*							cond.		
2	Late			*	*	*	*	*		cond.		
3	Long Scarlet Short Top	*	*	*	*	*	*	*		cond.		
4	Scarlet Turnip	*	*							cond.		
	VIOLET FAMILY.											
	VIOLA.											
	Odorata (*Sweet Violet*)					*	*	*	Europe	orn	herb	
	Tricolor (*Pansy*)					*	*	*	Europe	orn	herb	
	PINK FAMILY.											

OF PLANTS. Etc.			PECULIARITIES OF FRUIT, Etc.						
Hardin's	Foliage, etc	Flowers.	Product.	Size.	Shape.	Color.	Flavor.	Season.	No.
hardy	in threes	5'—7'							
hardy	in threes	blue							
hardy	in threes	white							
hardy	3, cut-tooth								
not hard		very large							
not hard	finely cut	very large							
hardy	large	red, etc							
hardy	glaucous	rose red							
	bright green	scented							
	pale, large	very large							
hardy	rich green	yellow							
half hard	evergreen	white							
hardy	glaucous	white							
hardy	thin	vel. green							
	very large	immense							
	large	white							
half hard		very large							
hardy	dark green	showy							
half hard		dull purple		3'—6'	bean	vel. green	sweet	Sep. Oc.	
hardy		yellow	product	small	oblong	red	sour		
half hard	evergreen					blue-black			
hardy		white							
hardy		pink-red							
hardy	very large	yellow							
				large	round			medium	1
			product	small	roundish	ash-green	good	early	2
				large	pyramidal			medium	3
			product	large	pyramidal	glaucous			4
hardy				large	round	sea-green	good	late	5
				large	round				6
					hemisph'l		sweet		7
hardy			product	large	flat	blu'h-gr'n	best	late	8
	large			large				early	1
	large			large		white		early	2
								medium	3
									1
hardy	few		prolific	medium	flat	purple	mild	early	2
						white	best	early	3
hardy	deep green				globular	purple, etc	sugary	late	4
hardy	large								
				large		pink	sharp	late	1
									2
	very short				very long			v. early	3
	large			small	spherical	scarlet	best	early	4
hardy	heart shap'd	violet, etc							
hardy		various							

No.	NAMES.	DISTRICTS. N. 1 2 3	C. 4 5	S. 6 7	Origin.	Use.	PECULIARITIES Class, Etc.	Hei't or Shape
	DIANTHUS.							
	Chinensis (China Pink)	** ** **	** **	** **		orn		
	PURSLANE FAMILY. PORTULACA.							
	Grandiflora	** ** **	**	* *	S. Amer	orn	annual	
	MALLOW FAMILY. ALTHÆA.							
	Rosea (Hollyhock)	** ** **	** **	** **	Syria	orn	herb	
	HIBISCUS.							
	Syrtacus (Althea)		* *	* *	Levant	orn	shrub	8 feet
	Esculentus (Okra)			* *	E. India		herb	
	LINDEN FAMILY. TILIA.							
	Americana (Basswood)	** ** **	** **	** **	America	or. tim	tree	100 feet
	RUE FAMILY. ZANTHOXYLUM.							
	Americanum (Prickly Ash)	* *		* *		or. med	small tree	25 feet
	QUASSIA FAMILY. AILANTHUS.							
	Glandulosus (Tree of Heaven)			* *	China	orn tim	tree	60 feet
	VINE FAMILY. VITIS.							
	Labrusca (Fox Grape).							
1	Adirondac			* *	N. Y.	fruit	vine	vigorous
2	Catawba	mf mf	mw	mw	N. C.	fruit		vigorous
3	Concord	mf mf	mf mf	mf mf	Mass	fruit		strong
4	Creveling?	trial f f	f	f f	Penn	fruit		vigorous
5	Delaware	f f	mf mf	f f	Ohio	fruit		weak
6	Diana	mf mf	f f	f f	Mass	fruit		vigorous
7	Hartford Prolific	mf mf	mf mf	mf mf	Conn	fruit		strong
8	Iona		* *		N. Y.	fruit		weak
9	Ives' Seedling	trial	trial	trial	Ohio	fruit		strong
10	Martha			trial	Penn	fruit		vigorous
11	Maxatawney		* *		Penn	fruit		vigorous
12	Northern Muscadine	* *			N. Y.	fruit		strong
13	Rebecca?	* *			N. Y.	fruit		weak
14	Rogers No. 1, Goethe?		f f	trial	Mass	fruit		vigorous
15	" No. 3, Massasoit?	* *			Mass	fruit		vigorous
16	" No. 4, Wilder?	* *	f f		Mass	fruit		vigorous
17	" No. 7. ?		* *		Mass	fruit		vigorous
18	" No. 15, Agawam?	* *	f f		Mass	fruit		vigorous
19	" No. 22, Salem?		* *		Mass	fruit		vigorous
	Æstivalis (Summer Grape)							
20	Herbemont			f f f	S. C.?	fruit		strong
21	Norton's Virginia		wine	wine	Va.	fruit		vigorous
22	Rulander		* *	f f f		fruit		vigorous
	Cordifolia (Winter Grape).							
23	Clinton	mf mf	mw mw	wine	N. Y.	fruit		strong
	AMPELOPSIS.							
	Quinquefolia (Va. Creeper)	* * *	* *	* *	America	orn	climber	50 feet
	STAFF-TREE FAMILY. CELASTRUS.							
	Scandens (Bitter-Sweet)		* *	* *	America	orn	climber	15 feet
	EUONYMUS.							
	Americanus (Strawberry Tree)		* *		America	orn	shrub	
	SOAPBERRY FAMILY. ÆSCULUS.							
	HIPPOCASTANUM (H. Ches.)	* *		* *	Asia	orn	tree	50—60 feet
	ACER (MAPLE).							
	Platanoides (Norway)			* *	Europe	orn	tree	60—70 feet
	Saccharinum (Sugar)	** ** **	** **	** **	America	or. tim	tree	70 feet
	Nigrum (Black Sugar)	* *			America	or. tim	tree	70 feet
	Dasycarpum (White)	** ** **	** **	** **	America	or. tim	tree	50 feet
	NEGUNDO.							
	Accroides (Box Elder)	** ** **	** **	** **	America	or. tim	tree	20—40 feet
	PULSE FAMILY. LABURNUM.							
	Vulgare (Common Laburnum)			* *	Europe	orn	small tree	
	ROBINIA.							
	Pseudacacia (Common Locust)	** ** **	** **	** **	America	timber	tree	50—75 feet
	Hispida (Rose Acacia)	* * *	* *	* *	America	orn	shrub	
	WISTARIA.							
	Frutescens (Am. Wistaria)	* * *	* *	* *	America	orn	climber	20 feet

OF PLANTS, ETC.				PECULIARITIES OF FRUIT, ETC.					
Hardiness.	Foliage, etc.	Flowers.	Product.	Size.	Shape.	Color.	Flavor.	Season.	No.
hardy ..	lanceolate..	various	.....	.....	.....	.....	.....	.....	
.....	.....	various	.....	.....	.....	.....	.....	.....	
hardy ..	heartshap'd	various	.....	.....	.....	.....	.....	.....	
half hard	three-lobed	various	.....	.....	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	.....	
hardy ..	heartshap'd	cream color	.....	.....	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	.....	
hardy?..	pennate....	ill-scented .	.....	.....	.....	.....	.....	.....	
hardy ..	large.....	.....	.....	medium.	round.....	black	sweet.....	early ...	1
hardy ..	mildews ...	.....	.....	medium.	round.....	red	sweet.....	late.....	2
hardy ..	coarse	.....	product..	large ...	round.....	black	sweet.....	early ...	3
hardy ..	large.....	.....	.....	medium.	round.....	black	sweet.....	early ...	4
hardy ..	mildews ...	.....	.....	small ...	round.....	red	v. sweet ..	early ...	5
hardy ..	mildews ...	.....	.....	small ..	round.....	red	v. sweet ..	medium.	6
hardy ..	coarse	.....	product..	large ...	round.....	black	harsh	v. early .	7
hardy ..	mildews ...	.....	.....	medium.	oval	red	v. sweet ..	early ...	8
hardy ..	coarse	.....	product..	medium.	round.....	black	.....	v. early .	9
hardy ..	.....	.....	.....	large ...	round.....	green. yel.	sweet.....	early ...	10
hardy ..	.....	.....	.....	medium.	round oval	green. wht	v. sweet ..	late.....	11
hardy ..	coarse	.....	.....	medium.	round.....	red	foxy	early ...	12
not hard	mildews ...	.....	.....	medium.	oval	amber	v. sweet ..	late	13
hardy ..	.....	.....	product..	v. large.	oval.....	yel. green.	sweet.....	late	14
hardy ..	.....	.....	.....	large ...	round.....	red	.....	early ...	15
hardy ..	.....	.....	.....	large ...	round.....	black	sweet.....	early ...	16
hardy ..	.....	.....	.....	.....	.....	.....	.....	.....	17
hardy ..	.....	.....	.....	large ...	roundish..	maroon ...	foxy	medium.	18
hardy ..	.....	.....	.....	large ...	round.....	red	sweet.....	early ...	19
half hard	smooth	.....	.....	small ...	round.....	black	sweet.....	late	20
hardy ..	smooth	.....	.....	small ...	round.....	black	sweet.....	late	21
half hard	round	.....	.....	small ...	round.....	black	v. sweet ..	medium.	22
hardiest	smooth	.....	product..	small ...	round.....	black	harsh	medium.	23
hardy ..	.....	.....	.....	.....	.....	.....	.....	.....	
.....	.....	green white	.....	.....	.....	.....	.....	.....	
.....	.....	.....	.....	.....	three-lob..	crimson...	.....	.....	
.....	.....	large white	.....	.....	.....	.....	.....	.....	
hardy ..	brightgreen	.....	.....	.....	.....	.....	.....	.....	
hardy ..	.....	.....	.....	.....	.....	.....	.....	.....	
hardy ..	.....	.....	.....	.....	.....	.....	.....	.....	
hardy ..	light green	.....	.....	.....	.....	.....	.....	.....	
v. hardy	.....	small,gr'ish	.....	.....	.....	.....	.....	.....	
half hard	.....	gold.yellow	.....	.....	.....	.....	.....	.....	
.....	small	white	.....	.....	.....	.....	.....	.....	
.....	.....	rose	.....	.....	.....	.....	.....	.....	
.....	.....	blue purple	.....	.....	.....	.....	.....	.....	

No.	NAMES.	DISTRICTS. N. 1	2	C. 3	4	S. 5	6	7	Original.	Use.	PECULIARITIES Class, Etc.	Hei't or Shape
	Sinensis (*Chinese Wistaria*)	*	*	*	*	*	*	*	China	orn	climber	
	PHASEOLUS.											
	Vulgaris (*Bean*)											
1	Early Valentine			*	*				Europe?	table	bush	16 inches
2	Fejee					*	*	*				18—20 inches
3	London Horticultural	*	*	*	*				England	table	annual	6 feet
4	Red Speckled Valentine					*	*	*		table	annual	
5	Speckled Cranberry	*	*	*	*					table	annual	
6	Speckled Crowder	*	*	*	*					table	annual	
7	White Dwarf	*	*	*	*					table	annual	
	Lunatus (*Lima Bean*).											
	Lima	*	*	*	*	*	*	*	S. A.	table	perennial	10 feet
	Sieva			*	*				Mass.	table	perennial	10—12 feet
	DOLICHOS.											
	Sinensis (*China Bean*)			*	*	*	*	*		table		15 inches
	PISUM (PEA).											
	Sativum (*Common Pea*).											
1	Daniel O'Rourke					*	*	*		table		
2	Extra Early	*	*	*	*					table		
3	May	*	*	*	*	*	*	*		table		
4	McLean's Advancer			*	*					table		
5	Tom Thumb	*	*							table		9 inches
6	Champion of England	*	*	*	*					table		5—6 feet
7	Missouri Marrowfat	*	*	*	*	*	*	*	America	table		3—4 feet
	CERCIS.											
	Canadensis (*Red Bud*)	*	*	*	*	*	*	*	America	orn	tree	30 feet
	GYMNOCLADUS.											
	Canadensis (*Ky. Coffee Tree*)	*	*	*	*	*	*	*	America	orn	tree	60 feet
	GLEDITSCHIA.											
	Triacanthos (*Honey Locust*)	**	**	**	**	**	**	**	America	or. hedge	tree	50—75 feet
	ROSE FAMILY.											
	PRUNUS.											
	(*Amygdalus*) *Nana*.											
	Flowering Almond	*	*	*	*	*	*	*	Asia	orn	shrub	2—3 feet
	White Flower'g Almond			*	*				Asia	orn	shrub	2—3 feet
	(*Amygdalus*) *Communis*.											
	Hard Shell Almond			*	*	*	*	*	Asia	nuts	tree	
	(*Amygdalus*) *Persica*								Asia	fruit	tree	
1	Bergen's Yellow					*	*	*	N. Y.	amateur		
2	Cole's Early Red			*	*				America	market		
3	Columbia			*	*	mf	mf	mf	N. J.	am. can.		
4	Coolidge's Favorite			*	*				Mass.			
5	Crawford's Early			mf	mf	mf	mf	mf	N. J.	market		
6	Crawford's Late			mf	mf	mf	mf	mf	N. J.	mar.can.		
7	Delaware White?					*	*	*		market		
8	Druid Hill			*	*	*	*	*	Maryland			vigorous
9	Early Tillotson			*	*	*	*	*	N. Y.			mildews
10	Early York (serrate)			*	*	*	*	*				
11	Galbraith					*	*	*	Illinois	market		
12	George the Fourth			mf	mf	mf	mf	mf	N. Y.	amateur		vigorous
13	Grosse Mignonne			*	*	*	*	*	France			
14	Hale's Early			mf	mf	mf	mf	mf	Ohio	mar. etc.		vigorous
15	Heath Cling			*	*	*	*	*	Maryland	mar. etc.		vigorous
16	Honest John (yellow)					mf	mf	mf		mar. etc.		
17	Jacques' Rareripe			*	*				Mass.			
18	Kenrick's Heath					*	*	*	N. E.	market		vigorous
19	La Grange					*	*	*	N. J.	can. etc.		vigorous
20	Large Early York			mf	mf	mf	mf	mf	N. Y.	mar. etc.		vigorous
21	Late Admirable					*	*	*	France	can. etc.		vigorous
22	Lemon Cling			*	*	*	*	*	S. C.	can. etc.		vigorous
23	Morris White			f	f	*	*	*		can. etc.		vigorous
24	Mountain Rose					*	*	*				
25	Oldmixon Cling			*	*					family		
26	Oldmixon Free			mf	mf	mf	mf	mf		market		
27	President					*	*	*	L. I.	family		
28	Pullen's Seedling					*	*	*				
29	Red Cheek Melocoton					*	*	*	America	market		
30	Reeves' Favorite					*	*	*	N. J.	market		
31	Smock			mf	mf	mf	mf	mf	N. J.	market		
32	Snow					*	*	*	America	family		
33	Stump the World					*	*	*	N. J.	market		
34	Susquehanna					*	*	*	Penn.			
35	Switzerland					mf	mf	mf		mar. etc.		

OF PLANTS, ETC.				PECULIARITIES OF FRUIT, ETC.				Season.	
Hardin's	Foliage, etc	Flowers.	Product.	Size.	Shape.	Color.	Flavor.		No.
			product			pink		early	1
v. hardy.	deep green	white	prolific		kidney.	drab	best	early	2
		purple		½ in. l'g.	egg.	flesh white			3
									4
									5
									6
									7
tender	lo'g, smooth	green, yel.			broad kid.	dull white		late	
	lo'g, smooth	green, yel.			broad kid.	dull white			
hardy	yel. green	white	product			white			
hardy			prolific		round	cream		v. early	1
								v. early	2
									3
				large			v. good	medium	4
			prolific			cream		v. early	5
			product	large	flattened	white			6
							good		7
		pink							
		white							1
hardy	narrow	rose							
hardy	narrow	white							
half hard									
buds ten.	reniform	small	moderate	large	roundish	yellow	best	Aug	1
hardy	globose	small	fruitful	medium	roundish	red	v. good	Jul. Aug	2
buds ten.	reniform	small	moderate	large	globular	brown	best	Sept	3
hardy	globose	small	fruitful	large	roundish	red & white	v. good	Aug	4
buds ten.	globose	small	fruitful	v. large.	oblong	yellow	good	Aug	5
buds ten.	globose	small		v. large.	roundish	yellow	good	Sept	6
hardy	globose	small	fruitful	medium	oblong	white	good	Sept	7
	globose	small	fruitful	large	roundish	red, white.	v. good	Sept	8
not healt	serrate	small	moderate	medium	round	red	v. good	Jul. Aug	9
buds h'y	serrate	large	product	medium	roundish	red & white	v. good	Jul. Aug	10
	globose	small		medium	roundish	red & white	v. good	Jul. Aug	11
hardy	globose	small	moderate					Aug	12
	globose	large		large	roundish	yel. red	v. good	Aug	13
buds h'y	globose	large	product	medium	round	red	good	July	14
hardy	reniform	small	moderate	v. large.	oblong	white	best	Sept. Oct	15
									16
	reniform	small	product	large	roundish	yellow	good	Sept	17
	reniform	small	product	v. large.	oblong	white	good	Sept	18
hardy	reniform	small	product	v. large.	oblong	white	best	Sept. Oct	19
hardy	globose	small	product	large	roundish	red & white	v. good	Aug	20
hardy	globose	small	product	v. large.	oval	white & red	best	Sept	21
hardy	reniform	small	product	v. large.	oblong	yellow	good	Sept. Oct	22
buds ten.	reniform	small	product	large	ovai	white	v. good	Sept	33
									24
	globose	small		large	round-oval	white-red	best	Aug. Sep	25
	globose	small	product	large	roundish	red	v. good	Aug. Sep	26
	globose	small		large	round-oval	green	v. good	Sept	27
									28
buds ten.	globose	small	product	large	round-oval	yellow	good	Aug. Sep	29
hardy	globose	small	product	large	roundish	yellow	good	Sept	30
buds ten.	reniform	small	product	large	oval	yellow	good	Sept. Oct	31
	reniform	small white		large	globular	white	v. good	Aug. Sep	32
	globose	small	product	large	roundish	white-red	v. good	Sept	33
				large	globular	yellow	v. good	Sept	34
									25

No.	NAMES.	DISTRICTS. N. 1	2	C. 3	4	5	S. 6	7	Origin.	Use.	PECULIARITIES Class, Etc.	Heft or Shape
36	Troth's Early Red			mf	mf	mf	mf	mf	N. J.	market.		
37	Walker's Early					*	*	*		market.		
38	Ward's Late Free					mf	mf	mf	America	market.		
39	White Imperial					*	*	*	N. Y.	family		
40	Yellow Alberge			mf	mf				France			
41	Yellow Rareripe					*	*	*	America	mar. etc.		
	Var. lævis (*Nectarine*).											
1	Boston					*	*	*	Mass.			
2	Downton					*	*	*	England			
3	Early Violet					*	*	*	France			
4	Elruge					mf	mf	mf	England			
5	Pitmaston's Orange					mf	mf	mf	England			vigorous
	Armeniaca (*Apricot*).											
1	Breda			*	*	mf	mf	mf	Africa			
2	Early Golden			*	*	*	*	*	N. Y.			vigorous
3	Hemskirke					mf	mf	mf	England			
4	Large Early					mf	mf	mf	France			vigorous
5	Moorpark					mf	mf	mf	England			
6	Peach					*	*	*	Piedmont			
	Spinosa Insititia, or *Domestica* (*Garden Plum*)											
1	Coe's Golden Drop			*	*	mf	mf	mf	England			branches
2	Coe's Late Red					mf	mf	mf				downy
3	Columbia					mf	mf	mf	N. Y.			
4	Damson			*	*	mf	mf	mf		cook, etc		slender, etc
5	Domine Dull					*	*	*	N. Y.			long, smooth
6	Duane's Purple	mf	mf	*	*				N. Y.			very downy
7	German Prune	mf	mf	*	*	*	*	*	Ger., etc.	dry, etc.		smooth
8	Green Gage			*	*				France			short jointed
9	Imperial Gage	mf	mf	*	*	mf	mf	mf	N. Y.			dark, downy
10	Jefferson					*	*	*	N. Y.			downy
11	Large Green Drying			*	*				England			smooth
12	Lawrence's Favorite					mf	mf	mf	N. Y.			smooth
13	Lombard	mf	mf	*	*				N. Y.			purple, glossy
14	McLaughlin					mf	mf	mf	Maine			smooth
15	Prince's Yellow Gage			*	*				N. Y.			
16	Red Diaper			*	*				France			smooth
17	Reine Claude de Bavay			*	*				France			smooth
18	Smith's Orleans					mf	mf	mf	N. Y.			glossy, purple
19	Washington					mf	mf	mf	N. Y.			downy
	Chicasa (*Chickasaw*).											
20	Chickasaw	*	*	*	*	*	*	*	America			
21	Miner		*						La.			sm'th, d'k red.
22	Wild Goose					*	*	*	Tenn			
	Cerasus (*Garden Red Cherry*).											
1	Kentish or Early Rich'nd	mf	mf	mf	mf	mf	mf	mf	Belgium			spreading
2	Late Kentish	*	*			*	*	*				spreading
3	Morello, Common	*	*			*	*	*				spreading
4	Morello, English	mf	mf	mf	mf	mf	mf	mf				
	Avium (*Bird Cherry*).											
5	Belle de Choisey			*	*				France			upright
6	Belle Magnifique	*	*	*	*							
7	Bigarreau or Yel. Spanish			*	*	*	*	*		market		spreading
8	Black Eagle					*	*	*	England			
9	Black Tartarian					*	*	*	Russia	market		upright
10	Cleveland					*	*	*	Ohio			
11	Early Purple Guigne					*	*	*				spreading
12	Early White Heart					*	*					r. upright
13	Elton					*	*	*	England			
14	Governor Wood	*	*	*	*	*	*	*	Ohio			round
15	Gridley					*	*	*		market		
16	Late Duke				*	*						
17	May Duke	*	*	*	*	*	*	*				fastigiate
18	Napoleon Bigarreau					*	*	*		market		
19	Reine Hortense	*	*	*	*							
20	Tradescants Black Heart					*	*	*	Europe	market		
	Mahaleb	*	*	*	*	*	*	*		st'ks orn		
	Serotina (*Wild Black*)	*	*	*	*	*	*	*		wood or.		
	Padus (*Bird Cherry*)			*	*					orn		
	SPIRÆA (MEADOW SWEET)											
	Opulifolia (*Nine Bark*)			*	*				America	orn	shrub	
	Douglasii			*	*				Oreg., etc.	orn	shrub	
	Callosa	*	*	*	*				Japan	orn	shrub	3—6 feet

OF PLANTS, Etc.				PECULIARITIES OF FRUIT, Etc.				Season.	
Hardin's	Foliage, etc	Flowers.	Product.	Size.	Shape.	Color.	Flavor.		No.
.....	globose	small	product.	medium	roundish	red	v. good	Jul. Aug.	36
.....	globose	small	product.	large	roundish	white-red	v. good	Aug	37
.....	globose	small	product.	large	roundish	white-red	v. good	Sept	38
.....	globose	small	.....	large	.....	white	best	Aug	39
.....	globose	small	.....	medium	roundish	yellow	good	Aug	40
buds ten	globose	small	moderate	large	roundish	yel. red	v. good	Aug	41
hardy	globose	small	product.	large	ro'nd-ov'l	yel. red	good	Aug	1
.....	reniform	small	.....	large	ro'nd-ov'l	green-red	v. good	Aug	2
.....	reniform	small	.....	large	ro'nd-ov'l	green-red	v. good	Aug	3
.....	reniform	small	.....	medium	ro'nd-ov'l	green-red	v. good	Aug	4
.....	globose	large	.....	large	roundish	or. yellow	best	Aug	5
.....	.....	buds red	product.	small	roundish	orange	best	Jul. Aug.	1
.....	.....	.....	product.	small	roundish	orange	v. good	July	2
.....	.....	.....	.....	medium	roundish	yellow	best	July	3
.....	.....	.....	.....	large	roundish	orange	v. good	July	4
.....	.....	.....	moderate	large	roundish	orange	best	Jul. Aug.	5
.....	.....	.....	.....	v. large	roundish	orange	best	Jul. Aug.	6
.....	.....	.....	product.	v. large	oval	yellow	v. good	Sept	1
.....	.....	.....	v. prod.	medium	round	purp. red	v. good	Oct	2
vigorous	.....	.....	product.	v. large	globular	purple	good	Aug	3
.....	.....	.....	product.	small	oval	purple	good	Au. Sept.	4
.....	.....	.....	product.	medium	long, oval	purple	good	Au. Sept.	5
.....	.....	.....	.....	v. large	oval	purple	good	Aug	6
.....	.....	.....	product.	large	long, oval	blue	v. good	Sept	7
.....	.....	.....	product.	small	round	green	best	Aug	8
.....	.....	.....	product.	large	oval	green	best	Aug	9
.....	.....	.....	moderate	large	oval	yellow	best	Aug	10
vigorous	.....	.....	.....	large	round	gr. yellow	good	Sept	11
thrifty	.....	.....	product.	large	roundish	yel. green	best	Aug	12
hardy	.....	.....	v. prod.	medium	ro'd-oval	red	good	Aug	13
hardy	.....	.....	product.	large	round	yellow	best	Aug	14
hardy	.....	.....	product.	large	oval	yellow	v. good	July, etc.	15
slow	.....	.....	.....	large	obovate	purple	v. good	Aug	16
vigorous	.....	.....	product.	large	roundish	gr. yellow	best	Sept	17
vigorous	.....	.....	v. prod.	large	oval	purple	v. good	Aug	18
hardy	.....	.....	.....	large	ro'd-oval	yellow	v. good	Aug	19
.....	.....	.....	.....	.....	.....	.....	.....	.....	20
.....	.....	.....	.....	medium	oblong	pur. red	.....	Sept	21
vigorous	.....	.....	.....	small	.....	purple	.....	July	22
hardy	.....	.....	v. prod.	medium	round	red	acid v. g'd.	June	1
hardy	.....	.....	product.	medium	round	red	v. good	July	2
hardy	.....	.....	product.	medium	round	black	v. good	July	3
.....	.....	.....	.....	large	heart-sh'd	black	good	July	4
hardy	.....	.....	moderate	.....	round	amber	best	June	5
hardy	.....	.....	product.	large	roundish	red	sub-acid	July	6
.....	.....	.....	.....	v. large	ob. h't sh.	yellow	sweet	June	7
.....	.....	.....	moderate	large	ob. h't sh.	d. purple	rich	June	8
.....	large	.....	.....	large	heart-sh'd	black	v. rich	June	9
.....	.....	.....	.....	medium	r'd h't sh.	red	v. good	June	10
hardy	lo'g petioles	.....	good	medium	r'd h't sh.	purple	v. good	May, etc.	11
.....	.....	.....	.....	small	h't-shape	yellow	good	May, J'e	12
.....	red foot stks	.....	.....	large	p'k h't sh.	yellow	v. rich	June	13
.....	.....	.....	v. prod.	large	h't-shape	yellow	best	June	14
.....	.....	.....	product.	large	h't-shape	black	good	J'e, July	15
.....	.....	.....	.....	large	ob. h't sh.	red	sub-acid	July	16
.....	.....	.....	product.	medium	ob. h't sh.	red	rich	May, J'e	17
.....	.....	.....	product.	v. large	h't-shape	yel. red	good	J'e, July	18
.....	.....	.....	.....	.....	.....	.....	.....	.....	19
.....	.....	.....	.....	large	h't shape	black	good	J'e, July	20
.....	.....	.....	.....	small	.....	black	.....	.....	
.....	.....	.....	.....	small	.....	red	.....	.....	
hardy	heart shap'd	white	.....	.....	.....	.....	.....	.....	
.....	lance-obl'g.	pink	.....	.....	.....	.....	.....	.....	
.....	lance-obl'g	pink	.....	.....	.....	.....	.....	.....	

No.	NAMES.	DISTRICTS. N. 1	2	C. 3	4	S. 5	6	7	Origin.	Use.	PECULIARITIES Class, Etc.	Hei't or Shape
	Lanceolata, or Reevesiana			*	*				China	orn	shrub	
	Prunifolia			*	*	*	*	*	Japan	orn	shrub	slender
	FRAGARIA (STRAWBERRY)									fruit	run. herbs.	
1	Agriculturist	*	*	*	*	*	*	*	N. J.			strong
2	Austin	*	*						N. Y.			vigorous
3	Downer's Prolific	*	*	*	*				Kentucky	nr. mar.		
4	Fillmore	*	*						Maryland			moderate
5	French's Seedling	*	*			f	f	f	N. J.			vigorous
6	Green Prolific	tr	tr	tr	tr	tr	tr	tr	N. J.			vigorous
7	Hovey's Seedling	*	*	*	*	*	*	*	Mass.	market		vigorous
8	Jenny Lind					*	*	*	Mass.	market		
9	La Constante					*	*	*				small
10	Large Early Scarlet			f	f							
11	Longworth's Prolific	f	f	f	f				Ohio			vigorous
12	McAvoy's Extra Red	trial				trial			Ohio			
13	McAvoy's Superior	*	*	f	f				Ohio			vigorous
14	Monitor	*	*						N. Y.			vigorous
15	Necked Pine	f	f						America			
16	Russell's Prolific	*	*	*	*	*	*	*	N. Y.			strong
17	Triomphe de Gand			*	*	*	*	*	Belgium			vigorous
18	Wilson's Albany	mf	mf	mf	mf	mf	mf	mf	N. Y.			vigorous
	RUBUS (BRAMBLE).										per herbs.	
	Occidentalis (*Black Raspberry*)										curv. canes.	long
1	American Black	*	*	*	*				America	cook, etc		
2	American White	*	*			*	*	*	America			
3	Doolittle	mf	mf	mf	mf	mf	mf	mf	N. Y.	market		branching
4	McCormick, or Miami	mf	mf				mf	mf	Ohio	market		
5	Ohio Everbearing	f	f	mf	mf	mf	mf	mf	Ohio			
6	Purple Cane	f	f	f	f	f	f	f	America	family		
	Idæus (*Red Raspberry*)										erect canes	tall
7	Catawissa	*	*	*	*				Penn		everbearing	
8	Clarke	trial							Conn	market	upright	v. strong
9	Hudson River Antwerp					*	*	*		market		short
10	Imperial	*	*						France		canes green	
11	Orange	*	*						Penn	amateur		
12	Philadelphia	mf	mf	*	*	*	*	*	Penn	market		
13	Red Antwerp					*	*	*				
	Villosus (*Blackberry*)										erect	1—6 feet
1	Crystal White					*	*	*	Illinois	amateur		slender
2	Dorchester	*	*						Mass.			
3	Kittatinny	*	*	trial		*	*	*	N. J.	market		
4	New Rochelle or Lawton			mf	mf	mf	mf	mf	N. Y.	market		
5	Wilson's Early	*	*						N. J.			
	ROSA (ROSE).											
	Setigera (*Prairie*)								America			
1	Baltimore Belle	*	*	*	*	*	*	*	America	climber		
2	President	*	*			*	*	*	America	climber		
3	Queen of the Prairies	*	*	*	*	*	*	*	America	climber		
	Rubiginosa (*Sweet Brier*)								Europe			
4	Common Sweet Brier	*	*	*	*	*	*	*				
	Sempervirens (*Evergreen*),											
5	Bennett's Seedling					*	*	*				
6	Dundee Rambler	*	*									
	Multiflora.											
7	Seven Sisters	*	*	*	*	*	*	*				
	Indica, (*China, etc.*)											
8	Coup d' Hebe			*	*						hybrid Chi.	
9	George IV	*	*	*	*						hybrid Chi.	
10	Madame Plantier	*	*	*	*	*	*	*			hybrid Chi.	
11	Aurora			*	*	*	*	*			tea-scented	
12	Bougere					*	*	*			tea-scented	
13	Caroline	*	*			*	*	*			tea-scented	
14	Devoniensis	*	*			*	*	*			tea-scented	
15	Gloire de Dijon	*	*			*	*	*			tea-scented	
16	Homer	*	*								tea-scented	
17	Appoline	*	*			*	*	*			Bourbon	
18	George Peabody	*	*	*	*	*	*	*			Bourbon	
19	Hermosa	*	*	*	*	*	*	*			Bourbon	
20	Joseph Gourdon	*	*								Bourbon	
21	Mrs. Bosanquet	*	*	*	*	*	*	*			Bourbon	
22	Paul Joseph	*	*			*	*	*			Bourbon	
23	Queen of the Bourbons	*	*	*	*						Bourbon	
24	Sir Joseph Paxton	*	*								Bourbon	

OF PLANTS, Etc.				PECULIARITIES OF FRUIT, Etc.					
Hardin's	Foliage, etc.	Flowers.	Product.	Size.	Shape.	Color.	Flavor.	Season.	No.
	oblong	wh'e, showy							
	small	double wh'e							
		white						May, J'e	
hardy	large, dark			v. large	conical	crimson	v. good		1
hardy			moderate	large	roundish	b. scarlet	good	early	2
hardy			product	medium	roundish	scarlet	good	early	3
	large, rough	pistillate	moderate	large	ob. con	d. crimson	v. good		4
hardy	medium		product	large	conical	d. scarlet	good	early	5
	large, thick		product	v. large	round	scarlet	good	early	6
hardy		pistillate		v. large	conical	crimson	good		7
			product	large	conical	b. scarlet	v. good	May, J'e	8
not hard	burn			large	conical	red	best	May, J'e	9
				medium	oval	b. scarlet	v. good	v. early	10
				large	roundish	b. crimson		May, J'e	11
		pistillate	v. prod	large	roundish	scarlet	good		12
		pistillate	product	large	irregular	crimson			13
			moderate	large	round, con	b. scarlet			14
		pistillate	product		conical	scarlet		early	15
	large		product	v. large	round, con	d. crimson	good		16
				v. large	conical, etc	b. crimson	v. good		17
hardy			product	large	irreg. con.	d. crimson	good	early	18
hardy	threes	white						J'e, July	
				small	flat	black	acid	early	1
				small	flat	white			2
			v. prod	large	flat	black	acid		3
			product	large	flat	black	sweet	late	4
					flat	black			5
				medium	oblate	pur. mar'n	sweet	early	6
tender	thick	white						J. Ju. etc	
tender			product	medium	flat	d. crimson	rather acid		7
hardy?	large			large	conical	br't crim	sweet		8
			product	large	conical	dull red	pleasant		9
				large	roundish	bright red	excellent		10
			v. prod	large	conical	orange	rich		11
hardy			product	large	roundish	pur. red	v. good		12
				large	globular	dark red	vinous		13
	3—5							Jul. Aug	
not hard			not prod.	medium	oval	cream wh.	sweet		1
hardy				large	ob. con.	deep black	high		2
hardy			product	large	round, con	black	sweet		3
hardy			product	v. large	oval	black	sweet		4
hardy			product	large	ob. oval	black	sweet	early	5
tender?		clusters				blush wh't		summer.	1
						blush		summer.	2
hardy				large	globular	rosy red		summer.	3
		single				pink			4
						pure white		summer.	5
									6
		clusters l'ge				bl'h to crim		summer.	7
		bright		large	beautiful	br't pink		summer.	8
				v. large		dark crim.		summer.	9
		in clusters				pure white		summer.	10
						yellowrose		summer.	11
				large		deep blush	fine		12
				large		rosy flesh		perpet'al	13
				large		cream whi.		perpet'al	14
				large	full	yellow		perpet'al	15
			free bl'mr		fine form	rosy pink		perpet'al	16
					double	light pink		perpet'al	17
						dark crim.		perpet'al	18
			bl'ms pro	large	double	light blush		perpet'al	19
						rosy flesh		perpet'al	20
				large	double	pale flesh		perpet'al	21
						violet pur.			22
			pro. blmr			fawn		perpet'al	23
			free bl'mr			deep rose		perpet'al	24

No.	NAMES.	DISTRICTS. N. 1	2	C. 3	4	5	S. 6	7	Origin.	Use.	PECULIARITIES Class, Etc.	Hei't or Shape
25	Souvenir de la Malmaison	*	*	*	*	*	*	*	----------	---------	Bourbon---	----------
26	Imperatrice Eugenie----	*	*	*	*	-------			----------	---------	Chi.or Beng	----------
	Moschata Hybrid.											
27	America ----------	*	*	----------					D. C. -----	---------	Noisette --	very strong---
28	Celine Forestier ------	*	*	----------					----------	---------	Noisette --	----------
29	Lamarque ----------	*	*	----------					----------	---------	Noisette --	----------
30	Solfaterre----------	------		*	*	*	*	*	----------	---------	Noisette --	----------
	Centifolia (Provence).											
31	Common Moss ------	*	*	*	*	-------			----------	---------	moss ------	vigorous------
32	Common Provence------	*	*	*	*	-------			----------	---------	Provence --	----------
33	Dwarf Burgundy-------	*	*	*	*	-------			----------	---------	Provence --	----------
34	Luxembourg ----------	*	*	*	*	*	*	*	----------	---------	moss ------	luxuriant ---
35	White Bath----------	----------				*	*	*	----------	---------	moss ------	----------
	Damascena (Damask).											
36	Madame Hardy----------	------		*	*	*	*	*	----------	---------	----------	----------
	Lutea?											
37	Harrison's Yellow------	*	*	*	*	*	*	*	----------	---------	----------	----------
38	Persian Yellow -------	*	*	*	*	*	*	*	----------	---------	----------	----------
	Not Referable?											
39	Arthur de Sansal ------	------		*	*	-------			----------	---------	----------	----------
40	Baronne Prevost-------	*	*	*	*	*	*	*	----------	---------	----------	vigorous------
41	Caroline de Sansal-----	------		*	*	-------			----------	---------	----------	vigorous------
42	Dr. Arnal----------	------		*	*	-------			----------	---------	----------	vigorous ------
43	Dr. Arnold ----------	*	*	*	*	*	*	*	----------	---------	----------	----------
44	Gen. Jacqueminot ------	*	*	*	*	*	*	*	----------	---------	----------	----------
45	Giant des Batailles-----	*	*	*	*	*	*	*	----------	---------	----------	dwarf---------
46	Gen. Washington-------	*	*	----------					----------	---------	----------	----------
47	L'Enfant du Mont Carmel	*	*	*	*	*	*	*	----------	---------	----------	vigorous------
48	La Reine ----------	*	*	*	*	*	*	*	----------	---------	----------	----------
49	Lord Raglan ----------	*	*	*	*	*	*	*	----------	---------	----------	----------
50	Lion des Combats ------	*	*	------		*	*	*	----------	---------	----------	----------
51	Madame Laffay---------	*	*	----------					----------	---------	----------	----------
52	Madame Rivers---------	*	*	*	*	*	*	*	----------	---------	----------	----------
53	Madame Charles Wood--	*	*	----------					----------	---------	----------	vigorous ------
54	Mrs. Elliott----------	*	*	*	*	*	*	*	----------	---------	----------	----------
55	Pæonie ----------	*	*	----------					----------	---------	----------	good grower--
56	Portland Blanche------	----------				*	*	*	----------	---------	hy. per-----	----------
57	Pius IX----------	*	*	------		*	*		----------	---------	----------	----------
58	Prince Albert----------	*	*	*	*	*	*		----------	---------	----------	----------
59	Sydonie----------	*	*	*	*	*	*		----------	---------	----------	--- ----------
	AMELANCHIER.											
	Canadensis (June-Berry).	------		*	*	*	*	*	America --	or. etc---	shrub or tr.	10—30 feet ----
	PYRUS.											
	Communis (Pear) ----------	----------							Europe ---	table----	tree---------	----------
1	Bartlett----------	mfmf	mf	mf	mfmfmf				England--	mar. etc.	shoots y.br.	upright------
2	Belle Lucrative----------	mfmf	mf	mf	mfmfmf				Belgium --	des. etc.	yel. brown.	spreading-----
3	Beurre Bosc----------	*	*	mf	mf	mfmfmf			Belgium --	des. etc.	br. olive ---	----------
4	Beurre Clairgeau-------	----------			*	*	*		France ---	market--	reddish ----	vigorous------
5	Beurre d'Anjou ---------	mfmf	*	*	mfmfmf				France ---	mar. etc.	yel. brown.	spreading-----
6	Beurre Diel ----------	*	*	*	*	-------			Belgium --	mar. etc.	----------	vigorous-----
7	Beurre Easter----------	-----	mf	mf	mfmfmf				----------	des. etc.	red. yellow.	vigorous------
8	Beurre Giffard----------	-----	mf	mf	*	*	*		France ---	mar. etc.	yel. brown.	moderate -----
9	Beurre Langelier-------	-----	*	*	-------				Jersey ----	----------	yel. brown.	vigorous------
10	Bloodgood----------	-----	mf	mf	mfmfmf				N. Y.-----	table etc.	red. brown.	moderate -----
11	Buffum ----------	mfmf	mf	mf	mfmfmf				R. Island -	tab: & m.	reddish ----	vig. upright---
12	Chaumontel ----------	-----	*	*	-------				France ---	----------	slender ----	----------
13	Clapp's Favorite--------	-------		----	trial				Mass.-----	market--	red. brown.	vig. upright---
14	Dearborn's Seedling ----		*	*	*	mfmfmf			Mass.-----	table----	red. brown.	----------
15	Doyenne Boussock ------	-----	f	f	f	f	f		Belgium --	tab. & m.	red. brown.	up. spreading-
16	Doyenne d'Ete----------	mfmf	f	f	m	m	m		Belgium --	tab. & m.	red. yellow.	upright -------
17	Doyenne White----------	amfamf	amf	amfamf					France ---	table----	light brown	upright -------
18	Duchesse d'Angouleme--	mfmf	mf	mf	mfmfmf				France ---	mar. etc.	yel. brown.	strong -------
19	Flemish Beauty----------	mfmf	mf	mf	mfmfmf				Belgium --	mar. etc.	olive brown	luxuriant -----
20	Glout Morceau ----------	-----	f	f	-------				Belgium --	dessert -	dark olive--	spreading-----
21	Howell ----------	mfmf	mf	mf	mfmfmf				Conn.-----	mar. etc.	red. yellow	upright------
22	Kirtland ----------	*	*	----------					Ohio------	amateur.	olive brown	moderate -----
23	Lawrence ----------	mfmf	mf	mf	mfmfmf				L. Island..	mar.& d.	yel. brown.	moderate -----
24	Louise Bonne de Jersey -	mfmf	mf	mf	mfmfmf				France ---	mar. etc.	olive brown	upright -------
25	Onondaga ----------	mfmf	*	*	*	*	*		Conn.-----	mar. etc.	olive brown	vigorous -----
26	Osband's Summer -------	mfmf	mf	mf	*	*	*		N. Y.-----	mar. etc.	yel. brown.	----------
27	Rostiezer----------	mfmf	*	*	f	f	f		----------	amateur.	olive brown	straggling ----
28	Seckel ----------	mfmf	f	f	mfmfmf				Penn.-----	des. etc.	olive brown	symmetrical --
29	Sheldon ----------	----------			*	*	*		N. Y.-----	mar. etc.	yel. brown -	erect----------

OF PLANTS, Etc.				PECULIARITIES OF FRUIT, Etc.				Season.	No.
Hardin's	Foliage, etc	Flowers.	Product.	Size.	Shape.	Color.	Flavor.		
						paie flesh.		perpet'l.	25
				v. large.		clear rose.	v. sweet	perpet'l.	26
			free bl'mr			cream yel.		perpet'l.	27
			free bl'mr			pale yel		perpet'l.	28
				v. large.		pale lemon		perpet'l.	29
						sal. yel.	fragrant	perpet'l.	30
			bl'ms pro	large	full			summer	31
				large	double	rose	v. sweet	summer	32
									33
			free bl'mr			pur. crim.		summer	34
delicate						pure white		summer	35
				large	double	white		summer	36
					double	yellow		summer	37
					double	gold. yel.		summer	38
									39
			abu. bl'mr	v. large.	full	deep rose.	best	perpet'l.	40
	luxuriant					clear flesh.	best	perpet'l.	41
			free bl'mr	large	double	br't crim.	best	perpet'l.	42
									43
			free bl'mr			crim. scar.		perpet'l.	44
			free bl'mr			fiery crim.		perpet'l.	45
			free bl'mr	v. large.		rosy car.		perpet'l.	46
				v. large.	full	pur. red.		perpet'l.	47
				v. large.	double	rosy lilac	sweet	perpet'l.	48
			free bl'mr			fiery crim.		perpet'l.	49
						red scar.		perpet'l.	50
				large	full	rosy crim.		perpet'l.	51
			free bl'mr			pale flesh.		perpet'l.	52
						brill. red.		perpet'l.	53
			abu. blmr	v. large.		rosy pur			54
			free bl'mr			cherry red.			55
						pure white		perpet'l	56
			pro. bl'mr	v. large.		pur. red.	best	perpet'l.	57
									58
									59
hardy		white		ber. like.		purplish	sweet		
hardy?	ovate	white	product.	large	tap. to s'k.	green, etc.	high	Sum.etc.	
	folded		v. prod.	large	ob. pyr.	yellow	vinous	Aug.Sep	1
blights			product.	medium.	variable	green	sweet	Sept	2
			regular	large	pyriform	russet	sweet	Oct?	3
			product.	large	pyriform	blushed	sweet	Oct. Nov	4
				large	ob. pyr.	greenish	vinous	Sept. Oct	5
	leaf blights		product.	large	pyriform	yellow	sweet	Sep. Dec.	6
blights				large	roundish	green	sweet	Jan. Mar.	7
				medium.	pyriform	yellow	vinous	Aug	8
				medium.	pyriform	yellow	vinous	Nov. Jan	9
			regular	medium.	turbinate	yel. rus.	aromatic	July	10
			regular	medium.	ob. obov.	yellow		Aug. Sep	11
				large	pyriform	yellow	sweet	Nov. Dec	12
			v. prod.	large	ob. pyr.	lem. yel.	sweet	Aug	13
			v. prod.	small	round pyr.	light yel	sweet	Aug	14
				large	obovate	deep yel.	sweet	Sept	15
				small	round ob.	yellow	sweet	Jul. Aug	16
				medium.	obovate	pale yel.	high	Sept. Oct	17
				v. large.	obovate	green yel	sweet	Sept. Oct	18
			product.	large	obovate	pale yel.	sweet	Sept	19
blights				large	variable	green yel	sweet	Dec. Feb	20
		early	product.	large	round pyr.	light yel.	vinous	Sept. Oct	21
				medium.	obovate	russet	sweet	Aug. Sep	22
hardy				medium.	ob. pyr.	lem. yel.	sweet	Nov. Dec	23
			product.	large	ob. pyr.	blushed	rich	Sept. Oct	24
				large	ob. pyr.	yellow	vinous	Sept. Oct	25
			prolific	small	obov. pyr.	yellow	sweet	Jul. Aug.	26
healthy			prolific	small	obl. pyr.	blushed	sweet	Aug. Sep	27
hardy			prolific	small	obovate	blushed	sweet	Aug. Sep	28
hardy			g. bearer.	medium.	round obo.	russet	sweet	Sept. Oct	29

No.	NAMES.	DISTRICTS. N. C. S. 1 2 3 4 5 6 7	Origin.	Use.	PECULIARITIES Class, Etc.	Hei't or Shape
30	Stevens' Genesee	------ * * * * *	N. Y.	amateur	dark gray	
31	Tyson	mfmf mf mf * * *	Penn	des. etc.	ol. yel. br.	upright
32	Urbaniste	----------mfmfmf	Belgium		yel. brown.	mod. vig'.
33	Vicar of Winkfield	mfmf mf mf m m m	France	mar. etc.	dark ol. br.	thrifty
34	Waterloo?	---------- *		amateur	ol. br. gray	vigorous
35	Winter Nelis	mf mf mfmfmf mfmf	Belgium	des. etc.	red. brown.	straggling
	Malus (*Apple.*)	----------	Asia	fruit	tree	20—50 feet
1	American Gold. Russet	----------mfmfmf		des. etc.	red.gray br.	upright
2	American Sum. Pear	* * f f mfmfmf	America	desert	slender	slow, large
3	Autumnal Strawberry	m m mf mf------	N. Y.			upright
4	Baccolinus	---------- * * *				thrifty
5	Bailey Sweet	* * * * -------	N. Y.		dark	vigorous
6	Baldwin	* * ------ * * *	Mass		red. brown.	spreading
7	Belmont	* * * * * * *	Va.	table	light olive	spreading
8	Ben Davis	m m m m * * *	Ky.		yellowish	large, upright
9	Benoni	mfmf f f f t f	Mass	table	slender br.	small, upright
10	Broadwe'l	f f * * f f f	Ohio		red. brown.	spreading
11	Buckingham	----------mfmfmf	Va.		red. dark	upright
12	Carbage	* * ----------				
13	Carolina Red June	mfmf mfmf mfmfmf	N. C.	table	slen. dark	upright
14	Cole's Quince	* * ----------	Mass?		red. brown.	spreading
15	Cooper	* * ----------		table	red. slender	spreading
16	Crain's Spice	---------- * * *				
17	Cullasaga	---------- * * *	N. C.			
18	Danvers' Win. Sweet	---------- f --	Mass		gray brown	rapid growth
19	Davidge	---------- *	Illinois?			
20	Domine	mfmf * * * -----	N. Y.		reddish	symmetrical
21	Duchess of Oldenburg	mfmf m m -------	Russia?	cooking.	stout,br'wn	small
22	Dyer	f f f f ------	France	table	dark, erect.	spreading
23	Early Harvest	f f f f mfmfmf	N. Y.	tab. cook	red. brown.	spread. small
24	Early Pennock	mfmf f f mfmfmf		cooking.	erect, dark.	upright
25	Early Strawberry	------ m m ------	N. Y.		slen. olive	upright, large.
26	English Golden Russet	m m f f * * *			slen. olive	spreading
27	Esopus Spitzenburg	* * * * mfmfmf	N. Y.		slender	drooping
28	Fallawater	------ * * * * *	Penn		stout, dark.	rapid spread
29	Fall Janneting	---------- * * *	Conn		stout, dark.	vigorous
30	Fall Orange	mfmf ----------	Mass	cooking.	red. diverg.	strong, erect.
31	Fall Pippin	* * * * * * *	America		stout,br'wn	spreading
32	Fall Wine	f f f f f f f			stout, dark.	slender, med.
33	Fall Winesap	mfmf f f -------	Illinois		----------	drooping
34	Fall Swaar of the West	* * f f -------			stout, dark.	
35	Fameuse	mfmf f f -------			red. brown.	drooping
36	Father Abraham, of Ill	---------- * * *	Va.		----------	large
37	Fink	---------- .... *	Ohio		----------	upright
38	Fulton	mfmf mf mf * * *	Illinois		slen. red.br.	large, upright.
39	Gilpin	c c m m m m m	Va.		shoots dark.	slender med.
40	Golden Sweeting	mf mf mf mf mfmfmf	Conn		erect,stout.	spreading
41	Gravenstein	* * * * * * *	Holstein		red. brown.	spreading
42	Grimes' Golden	trial ----------	Va.		stout, dark.	large
43	Harrison	------ * * -------	N. J.		stout, olive	large, spread.
44	Hawley	------ * * -------	N. Y.		----------	round, ugly
45	Hawthornden	* * ------- * --	Scotland		red. brown.	small, droop.
46	Hewes' Virginia Crab	---------- * --	Va.		sparse	large, spread.
47	High-Top Sweeting	f f f f * * *	Mass		light, red,br.	upright
48	Hocking	* * ------- * --			----------	spreading
49	Horse	---------- * *	N. C.	c'k. dry.	light, red,br.	vigorous
50	Hubbardston Nonsuch	f f mfmf f f f	Mass		gray brown	drooping
51	Hurlbut	------ * * -------	Conn		stout	spreading
52	Jerrall	* * ----------			----------	
53	Jersey Black	---------- * * *			small	
54	Jersey Sweeting	---------- * --		des. etc.	strong	spreading
55	Jewett's Fine Red	------ * * -------	N. H.		----------	
56	Jonathan	mfmfmf mf mfmfmf	N. Y.	mar. etc.	spreading	
57	Kentucky	------ * ----------	Kentucky		----------	
58	Keswick Codlin	mfmfmf mf mfmfmf	England	mar. etc.	upright	vigorous
59	King of Tompkins	trial ---- ----------	N. J.?		vigorous	
60	Kirkbridge White	* * ------- * --		mar. etc.	strong	small
61	Ladies Sweeting	* * ------- * --		desert	----------	
62	Lady Apple	---------- * --	France	des. etc.	v. dark	large
63	Large Striped Pearmain	------ * * mfmfmf	Kentucky		----------	
64	Large Yellow Bough	* * * * mfmfmf		des. etc.	light green.	compact
65	Limber Twig	----- m m mfmfmf	N. C.?		slender	
66	Lowell	mfmf m m f f f			slender	round head

OF PLANTS, ETC.				PECULIARITIES OF FRUIT, ETC.				Season.	No.
Hardin's	Foliage, etc.	Flowers.	Product.	Size.	Shape.	Color.	Flavor.		
----------	----------	----------	----------	large ---	roundish--	yellow ----	sweet-----	Aug.Sep	30
----------	----------	----------	tardy ----	medium.	ac. pyr----	blushed --	sweet-----	Aug.Sep	31
----------	----------	----------	----------	medium.	ob. pyr----	pale yel---	rich-------	Sep. Oct.	32
hardy---	----------	----------	product--	large ---	long pyr--	pale yel---	good------	Oct. Jan.	33
----------	----------	----------	product--	large ---	ob. pyr----	blushed --	vinous ---	Sep. Oct.	34
hardy---	----------	----------	regular --	medium.	r'nd obo --	russeted --	sweet-----	Nov. Jan	35
hardy---	----------	white, etc--	----------	----------	----------	----------	----------	----------	
tender --	serrate-----	reddish ----	product--	small ---	conical----	russet ----	sub-acid --	Nov. Dec	1
hardy---	----------	white ------	product--	medium.	round------	striped----	sub-acid --	Aug. Sep	2
----------	----------	----------	product--	medium.	r'd obl ---	blushed --	sub-acid --	Aug. Sep	3
----------	----------	----------	product--	small ---	round------	striped----	sub-acid --	Dec. Mh.	4
----------	----------	----------	product--	large ---	round------	striped----	sweet-----	Oct -----	5
tender --	large ------	----------	product--	large ---	flat --------	striped----	sub-acid --	Oct. Jan.	6
tender --	crenate ----	----------	product--	large ---	oblong----	blushed --	sub-acid --	Oct. Dec.	7
hardy---	large ------	whitish ----	product--	large ---	oblong----	striped----	sub-acid --	Dec. Jan.	8
----------	thin, long--	white? ----	product--	small ---	round------	striped----	sub-acid --	Jul. Aug.	9
----------	----------	----------	product--	large ---	ronnd------	blushed --	sweet-----	Dec------	10
----------	narrow ----	----------	----------	large ---	conical----	striped----	sub-acid --	Oct. Dec.	11
----------	----------	----------	----------	medium.	r'nd. con--	yellow ----	sweet-----	Sep. Oct.	12
hardy---	dark --------	reddish ----	product--	medium.	oblong----	blushed --	sub-acid --	JuneJuly	13
----------	----------	whitish ----	--- ------	large ---	round------	yellow ----	sub-acid --	Aug -----	14
cankers -	----------	reddish ----	----------	large ---	flat --------	striped----	sub-acid --	Sep. Oct.	15
----------	----------	----------	----------	small ---	flat --- ---	dull red---	spicy ----	Mar, Jne	16
----------	----------	----------	v. prod---	large ---	round------	striped----	sweet-----	Jan. Ap'l	17
----------	----------	----------	product--	large ---	round------	green -----	sweet-----	Dec. Jan.	18
----------	----------	--- ------	product--	large ---	conical----	striped----	sweet-----	Mar. My	19
----------	----------	whitish ----	product--	large ---	flat --------	striped----	acid-------	Oct. Dec.	20
----------	----------	reddish ----	product--	medium.	flat --------	striped----	acid-------	Jul. Aug	21
not hard	narrow ----	----------	product--	medium.	round------	yellow ----	sub-acid --	Sep. Oct.	22
short liv.	----------	white? ----	not prod-	medium.	flat? ------	white ------	sub-acid --	June J'y	23
----------	----------	reddish ----	----------	large ---	conical----	striped----	acid-------	Jul. Aug.	24
----------	crenate ----	whitish ----	late bear-	medium.	conical----	striped----	acid-------	Jul. Aug.	25
----------	----------	white ------	product--	medium.	round------	russet ----	sub-acid --	Jan. Feb.	26
tender --	crenate ----	----------	product--	medium.	conical----	striped----	acid-------	Dec. Feb	27
short liv.	large ------	reddish ----	produet--	large ---	round------	green -----	sweet?----	Nov. D'r	28
----------	----------	----------	product--	----------	----------	----------	----------	----------	29
hardy---	----------	----------	product--	large----	round------	blushed --	acid-------	Oct. No?	30
short liv.	serrate-----	whitish ----	bears y'g.	v. large.	round------	yellow ----	acid-------	Sep. Dec.	31
not hard	----------	reddish ----	----------	medium.	flat --------	striped----	sub-acid --	Sep. Oct.	32
hardy---	----------	----------	----------	medium.	round------	blushed --	acid-------	----------	33
hardy---	----------	----------	----------	large ---	roundish--	rus. yel---	sub-acid --	Sep. Oct.	34
----------	----------	reddish ----	product -	medium.	round------	striped----	sub-acid --	Oct. Dec.	35
----------	----------	----------	not prod-	medium.	flat --------	striped----	sub-acid --	M'y July	36
----------	----------	----------	product -	small ---	flat --------	wh. yel ----	sub-acid --	Nov. Jan	37
----------	----------	white ------	not prod-	large----	flat. --------	blushed --	sub-acid --	Nov. D'r	38
short liv.	----------	reddish ----	product--	small ---	round------	striped----	sweet-----	Apl. May	39
----------	----------	----------	product--	large ---	round------	yellow ----	sweet-----	Aug -----	40
----------	----------	white ------	late bear-	large ---	flat. --------	striped----	acid-------	Aug. Sep	41
hardy---	----------	----------	product -	medium.	flat. --------	yellow ----	sub-acid --	Dec. Mar	42
----------	----------	----------	----------	small ---	conical----	yellow ----	sub-acid --	April ---	43
----------	----------	reddish ----	ear. bear-	large----	flat. --------	yellow ----	sub-acid --	Aug. Sep	44
----------	----------	red --------	ear. bear-	large----	flat. --------	striped----	sub-acid --	Jul. Aug.	45
----------	----------	----------	----------	small ---	round------	striped----	acid-------	Nov Jan	46
hardy---	----------	whitish ----	product -	medium.	round------	yellow ----	sweet-----	June J'y	47
----------	----------	reddish ----	----------	large----	flat. --------	striped----	sub-acid --	Aug. Sep	48
----------	----------	----------	product--	large----	round------	yellow ----	sub-acid --	Aug. Sep	49
----------	----------	reddish ----	product--	large----	round------	striped----	sub-acid --	Oct. Dec.	50
----------	----------	----------	----------	medium.	flat. --------	striped----	acid-------	Dec? ---	51
----------	----------	----------	----------	----------	----------	----------	----------	----------	52
----------	----------	----------	product--	medium.	flat. --------	striped----	sub-acid --	Dec ----	53
----------	----------	whitish ----	product--	medium.	conical----	striped----	sweet-----	Aug. Sep	54
----------	----------	----------	product--	medium.	flat. --------	striped----	acid-------	Dec ----	55
----------	sparse -----	whitish ----	product--	medium.	oblong----	striped----	sub-acid --	Nov. Jan	56
----------	----------	----------	----------	large ---	----------	----------	----------	----------	57
hardy---	----------	whitish ----	product--	medium.	oblong----	yellow ----	acid-------	June Au	58
hardy---	----------	----------	product--	large ---	flat. --------	striped----	sub-acid --	Nov. Jan	59
hardy---	----------	whitish ----	product--	medium.	oblong----	yellow ----	sub-acid --	Jul. Aug.	60
thrifty --	toothed ---	----------	product--	large ---	round------	striped----	sweet-----	Dec ----	61
----------	dark -------	reddish ----	product--	small ---	flat. --------	blushed --	sub-acid --	Dec. Mar	62
----------	----------	----------	----------	large----	----------	striped----	----------	----------	63
----------	crenate ----	whitish ----	not prod-	large ---	conical----	yellow ----	sweet-----	Ju. Aug.	64
thrifty --	----------	reddish ----	not prod-	small ---	conical----	striped----	sub-acid --	Mar. Apl	65
----------	----------	----------	product--	large----	round------	yellow ----	sub-acid --	Aug. Sep	66

No.	NAMES.	DISTRICTS. N. C. S. 1 2 3 4 5 6 7	Original.	Use.	PECULIARITIES Class, Etc.	Hei't or Shape
67	Maiden's Blush	mfmf mfmfmf mfmf	N. J.	mar. etc.	spreading	
68	May of Myers	trial		market		
69	Melon	* * f f f	N. Y.			spreading
70	Michael Henry	mf mf * * *	N. J.	market		small
71	Milam	* * f f f f f			dark	round head
72	Minkler	mfmf	Illinois?		reddish	spreading
73	Mother	f f f f	Mass.	table	dark green	
74	Newtown Pippin	* * * * amf amf	N. Y.	tab., etc.	reddish	large
75	Northern Spy	amf amf mf mf * * *	N. Y.			large
76	Northern Sweet	* *	Vermont	eating	stout, red	
77	Nickajack	* * mfmfmf	Georgia	market	stout	large
78	Ortley	* * mf mf mf mf mf mf	N. J.	eating	dark	large
79	Paradise Win. Sweet	f f f f f	Penn.	eating		upright
80	Peck's Pleasant	* * * * f f f	R. I.	eating		spreading
81	Pennock	* *	Penn.	market		large
82	Perry Russet	* *				
83	Pomme Grise	* *			slender	
84	Porter	mfmf mfmfmf mfmf	Mass.	mar. etc.	slender	small
85	Primate	* *		eat. etc.	slender	stocky
86	Pryor's Red	mf mfmfmfmf	Va.	eat. etc.	reddish	large
87	Rambo	mfmf mfmf mfmf mfmf	Penn.	eat. etc.		upright
88	Ramsdell's Sweet	mfmf mfmf	Conn.		slender	upright
89	Rawles' Janet	mfmf mfmf mfmf mf	Va.	mar. etc.	brownish	spreading
90	Red Astrachan	* * mfmf	Russia?	market		
91	Red Canada	* *		mar. etc.		slender
92	Red Russet	* *	N. H.			
93	Rhode Island Greening	* * mf mf * * *		mar. etc.	dark	crooked
94	Richards' Graft	* *	N. Y.		stout, dark	
95	Roman Stem	mfmf * *	N. J.	eating		small
96	Rome Beauty	f f mfmfmf	Ohio	market	slender, red	
97	Roxbury Russet	* * *	Mass.	market		spreading
98	Sangamon Red Streak	* *	Illinois?	market		
99	Sine Qua Non	* * *	N. Y.	eating	light green	round head
100	Smith's Cider	* * * * * * *	Penn.	market	slender	vigorous
101	Smoke House	* *				
102	Sops of Wine	mfmf mfmf mfmf mf		market	stout	spreading
103	Sparks' Late	* * *			stout	upright
104	Stannard	mfmf mfmf	N. Y.	mar. etc.	large	spreading
105	Stark	trial trial trial			brown, red	upright
106	Stri'd or Scoll'd Gillifl'r	m m			long	
107	Striped Pippin	* *				
108	Summer Queen	* * m m	N. Y.	market		spreading
109	Summer Rose	* * * *	N. J.	eating	stout	spreading
110	Swaar	f f f f f f f	N. Y.	eating	stout, dark	spreading
111	Sweet Vandevere	mfmf * * *			slender	
112	Tart Bough	* *				
113	Tewksbury Win. Blush	* * *	N. J.	eating		upright
114	Tolman's Sweeting	mfmf mf mf * * *	R. I.	feed, etc.		spreading
115	Transcendent Crab	mfmf				
116	Twenty Ounce Apple	* *	Conn.		slender	round head
117	Vandevere Pippin	* * * *	Penn ?		stout	spreading
118	Wagener	mfmf mf mf f f f	N. Y.	eating	stout	upright
119	Westfield Seek-no-further	mfmf mf mf	Conn.	tab. etc.		spreading
120	White Pippin	mfmf mfmf		mar. etc.	shoots dark	upright
121	White Winter Pearmain	f f mfmfmf			dark	spreading
122	Winesap	mfmf mfmf mf mfmf	N. J.	tab, etc.		spreading
123	Willow Twig	mfmf m m m m m	Virginia	mar. etc.	slender	spreading
124	Williams' Favorite	m m m	Mass.			spreading
125	Wine Ap. Hays'or Pa. R.S	* * * * *		cook. etc.	slender	upright
126	Yellow Bellefleur	f f mfmfmf	N. J.	eat. etc.	yellowish	drooping
127	Yellow Ingestrie	* *	England			
128	Yellow Siberian Crab	mfmf mf mf mfmfmf				
	Spectabilis (Chinese Flow. Crab)	* * * * *	China	orn		
	Prunifolia (Siberian Crab)			orn. etc.		
	Baccata (Berry Crab)	* * *		orn		
	Coronaria (American Crab)	* * *	America	orn		small tree
	Americana (Mountain Ash)	* * * * * * *	America	orn		small tree
	Aucuparia (European Ash)	* * * * * *	Europe	orn		medium tree
	CYDONIA (QUINCE).					low trees, etc.
	Vulgaris (Common Quince)		Levant			
	Orange	mfmf mf mf mf mfmf				
	Portugal	* * *				
	Japonica (Japan Quince)	* * * * * * *	Japan			

OF PLANTS, Etc.				PECULIARITIES OF FRUIT, Etc.					
Hardin's	Foliage, etc.	Flowers.	Product.	Size.	Shape.	Color.	Flavor.	Season.	No.
hardy?		red	product	large	flat	blushed	acid	Sep. Oct.	67
			product	medium.	round.	yellow	sweet	May Jun	68
				large	flat.	striped	sub-acid	Nov. Jan	69
			product	medium.	conical	yellow	sweet	Dec. Jan.	70
hardy	dark	reddish		small	conical	striped	sub-acid	Dec. Jan.	71
hardy				large	flat	striped	sub-acid	Mar. My	72
			product	large	oblong	striped	sweet	Oct. Jan.	73
	dark	white	moderate	medium.	round.	yellow	acid	Dec. Mh.	74
		v. late	product	large	conical	striped	acid	Dec. M'y	75
			product	large	round.	yellow	sweet	Sept	76
		whitish	product	large	flat.	striped	sub-acid	Mar. My	77
tender		reddish	product	large	oblong	yellow	acid	Nov. Jan	78
			product	large	round.	white	sweet	Dec. Mar	79
hardy		reddish	product	large	round.	yellow	sub-acid	Dec. Jan.	80
	sharp			large	flat	striped	sub-acid	Dec. Feb	81
hardy	large		product	medium.	flat	russet	acid	Dec. Jan.	82
hardy			product	small	flat.	russet	sub-acid	Jan. M'h	83
hardy			product	large	oblong	yellow	acid	Aug. Oct	84
		reddish	product	medium.	round.	yellow	sub-acid	Jul. Aug.	85
hardy	scattering		product	large	round.	russet	sub-acid	Dec. Feb	86
tender	light green.	whitish	product	medium.	flat	striped	sub-acid	Oct Dec.	87
	whitish		product	medium.	oblong	striped	sweet	Sep. Dec.	88
tender			product	medium.	conical	striped	sub-acid	Feb. M'h	89
hardy	large	white	shy?	large	flat	striped	acid	July	90
hardy	wavy	reddish	product	medium.	conical	striped	sub-acid	Dec. Feb	91
				large	round.	russet	sub-acid	Jan. Ap'l	92
tender	dark		product	large	flat	green	sub-acid	Oct. Dec.	93
			product	medium.	flat.	striped	sub-acid	Sep. Oct.	94
		whitish	product	medium.	round.	yellow	sub-acid	Dec. Jan.	95
hardy		late	product	large	flat.	striped	sub-acid	Dec. Feb	96
tender	gray		product	large	flat	russet	acid	Nov Jan	97
				large	conical	striped	sub-acid	Nov?	98
		white		medium.	conical	white	sub-acid	Jul. Aug.	99
hardy		whitish	product	medium.	round.	striped	sub-acid	Dec. Jan.	100
				large	flat.	striped	sub-acid	Oct. Nov	101
hardy		whitish	product	medium.	round.	striped	sub-acid	July Sept	102
			product	medium.	oblong	yellow	sub-acid	Dec. Jan.	103
hardy			product	large	roundish	striped	sub-acid	Nov. Feb	104
			product	large	roundish	striped	sub-acid	Dec. May	105
				large	oblong	striped	sub-acid	Sept	106
									107
hardy?	crenate	whitish	product?	large	conical	striped	sub-acid	Jul. Aug.	108
hardy	glaucous		product	small	round.	striped	sub-acid	Jul. Aug.	109
	large	reddish	product	large	round.	yellow	sub-acid	Dec. Jan.	110
			product	large	flat	striped	sweet	Dec. Jan.	111
						white	acid		112
			product	small	flat	blushed	acid	Mar. Apl	113
hardy	waved	whitish	product	medium.	round.	yellow	sweet	Sep. Jan.	114
hardy			product	small	oblong	blushed	sub-acid	Aug. Sep	115
	large		ear. bear.	large	conical	striped	acid	Oct. Dec.	116
			product	large	flat	striped	acid	Dec.	117
			product	large	flat	striped	sub-acid	Nov. Dec	118
hardy	serrate		product	medium.	conical	striped	sub-acid	Dec.	119
	large		product	medium.	round.	white	acid	Dec. Jan.	120
			product	medium.	conical	yellow	sub-acid	Dec. Mar	121
hardy		red	product	medium.	conical	blushed	acid	Jan. Mar.	122
		reddish	product	large	round.	striped	sub-acid	Dec. Apl	123
				medium.	round.	striped	sub-acid	Jul. Aug	124
tender	small		product	large	flat	striped	acid	Oct. Dec.	125
		whitish	shy?	large	conical	yellow	acid	Oct. Jan.	126
				small	round.	yellow	acid	Sep. Oct.	127
	large	white	product	small	oblong	yellow	acid	Aug. Sep	128
	smooth	rose, etc.							
		white				yellowish			
		white							
	ovate	reddish				green			
	pointed	white				scarlet			
	oblong	white				scarlet			
	oval	white		large	round.	yellow		Sep. Oct.	
	large	white	shy	v. large.	ob. ovate	yellowish	mild		

No.	NAMES.	DISTRICTS. N. 1	2	C. 3	4	S. 5	6	7	Origin.	Use.	PECULIARITIES Class, Etc.	Hei't or Shape
	Blush			*	*							
	Crimson			*	*							
	CALYCANTHUS FAM'Y.											
	CALYCANTHUS.											
	Floridus			*	*	*	*	*	America	orn		shrub
	SAXIFRAGE.											
	RIBES (CURRANT, ETC.)									fruit. or.		
	Grossularis (Eng. Gooseb'ry.)								Europe			
1	Woodward's Whitesm'h.	*	*						England ?	fruit	erect	
	Hirtellum?											
1	Downing's Seedling	*	*	*	*				N. Y.	family	slender	upright
2	Houghton's Seedling	mf	mf	mf	mf	mf	mf	mf	Mass		slender	spreading
3	Mountain Seedling	*	*						N. Y.		strong	straggling
4	Pale-Red	*	*	*	*	*	*	*			slender	upright
	Rubrum (Red Currant.)											
1	Cherry	mf	mf	*	*	mf	mf	mf	Italy	market	stout	
2	Gondouin White			*	*				France		strong	
3	La Versaillaise	*	*	*	*				France			
4	Long Bunched Red	*	*									
5	Red Dutch	mf	mf	mf	mf	mf	mf	mf		fam. etc.	erect	
6	Victoria			f	f	f	f	f			slender	spreading
7	White Dutch	mf	mf	mf	mf	*	*	*				
8	White Grape	f	f	mf	mf	mf	mf	mf		amateur	slender	spreading
	Nigrum (Black Currant)								Europe			
	Black Naples	mf	mf	*	*							coarse
	Aureum (Missouri)	*	*	*	*				America			
	Large Fruited Missouri.	*	*							fruit, etc.		
	Sanguineum			*	*				Oreg., etc.	orn		
	PHILADELPHUS SYRINGA.											
	Coronarius (Mock Orange)	*	*	*	*	*	*	*	Japan?	orn.	erect	shrub
	DEUTZIA.								Japan, etc.			shrub
	Gracilis	*	*	*	*	*	*	*				2 feet
	Crenata	*	*	*	*							
	Scabra			*	*	*	*	*				5 feet
	WITCH HAZEL.											
	LIQUIDAMBAR.											
	Styraciflua (Sweet Gum)					*	*	*	America	orn.	tree	130 feet
	GOURD.										annual	
	CUCURBITA (PUMP. & SQUA.)											
	Pepo (Pumpkin).											
1	Cashew	*	*	*	*							
2	Cheese			*	*							
3	Yellow Field	*	*	*	*					stock		12 feet
	Verrucosa, etc.											
1	Bush Sum. Wart Cr. Neck	*	*	*	*	*	*	*		cooking		2 1-2 feet
2	Early Yel. Bush Scollo'd.	*	*	*	*	*	*	*		cooking		2 1-2 feet
3	Autumnal Marrow	*	*	*	*	*	*	*				12 feet
4	Hubbard	*	*	*	*	*	*	*				12 feet
5	Turban			*	*	*	*	*				
6	Vegetable Marrow	*	*	*	*	*	*	*				12 feet
	CITRULLUS (WATERMELON)											
	Vulgaris.											
1	Black Spanish	*	*									
2	Ice Cream			*	*	*	*	*				
3	Long Island	*	*									
4	Mountain Sprout	*	*	*	*	*	*	*		market		
	CUCUMIS (M'K. MELON, &C.)											
	Melo.											
1	Alton Nutmeg						*			market		
2	Green Citron			*	*					mar. etc.		
3	Nutmeg			*	*	*	*	*				
4	Persian						*					
5	White Japan			*	*							
6	Ward's Nectar			*	*							
7	Yellow Cantaloupe			*	*							
	Sativus (Cucumber)								East India.	eating		
1	Early Cluster			*	*	*	*	*				
2	Early Frame			*	*	*	*	*				6—10 feet
3	Early Russian			*	*							
4	Long Green Turkey			*	*	*	*	*				
	PARSLEY.											
	DAUCUS (CARROT.)								Eur'e., etc.		bien herb	
	Carota (Common Carrot).											

OF PLANTS, ETC.				PECULIARITIES OF FRUIT, ETC.					
Hardin's	Foliage, etc.	Flowers.	Product.	Size.	Shape.	Color.	Flavor.	Season.	No.
	oval	blush		small		green	uncatable.		
	oval	crimson		small		green			
		dull red							
mildews			product.	large	roundish	white	best		1
vigorous			v. prod.	medium.	roundish	whitish	v. good	J'e, July	1
vigorous			v. prod.	medium.	roundish	pale red	v. good	J'e, July	2
vigorous			product.	large	oval	brown red	good	J'e, July	3
vigorous			v. prod	small	oval	pale red	v. good	J'e, July	4
	thick		product?	v. large.	round	deep red	acid	J'e, July	1
			product.	large	round	yellow	sweet	J'e, July	2
	large		product.	v. large.	round	dark red	acid	J'e, July	3
			v. prod.	large	round	deep red		J'e, July	4
			v. prod.	large	round	deep red	r.ch acid	J'e, July	5
			v. prod.	large	round	light red	acid	late	6
			product?	large	round	yel. white.	sweetish	early	7
			product?	v. large.	round	white yel	sweet		8
			product.	v. large.		black	sweet		
		yellow		v. large.		black			
		rose red							
	ovate	creamwhite						late sp'g	
	ovate	snow white						late sp'g	
	ovate	dull white						summer	
		white						late	
	aut. pur. red	greenish							
									1
	large		v. prod.	large	flat	red or.	sweet		2
				large	roundish	or. yellow	coarse		3
			product.	medium.	oblong	yellow	v. good	early	1
	large			small	hemisph'l	yellow	good	early	2
				medium.	ovoid	cr. yellow.	best	late	3
				medium.	oval	cl. bl. ol. gr.	best	late	4
	medium			medium.	turban	trick red	best	late	5
				small	oblong	pale yel			6
hardy			product.	large	roundish	d. green	best		1
hardy			prolific	large	round	pale green		early	2
									3
			v. prod.	large	long oval	striped	best		4
			product.	large	roundish		v. good		1
			product.	medium.	round	green	v. good		2
				medium.		pale green	best		3
				large	oblong		best		4
			product.	medium.	roundish	cream whi.	v. good	early	5
									6
									7
hardy				small	oblong	green	good	early	1
			v. prod.	small	oblong	d'p green	good	early	2
hardy			v. prod.	small	oblong		good	v. early	3
			v. prod.	large	long	d'p green	v. good		4

No.	NAMES.	DISTRICTS. N. 1	2	C. 3	4	S. 5	6	7	Original.	Use.	PECULIARITIES Class, Etc.	Hei't or Shape
1	Early Horn	-----		*	*	*	*	*	----------	eating --	----------	6 inches -----
2	Long Orange	*	*	*	*	-------			----------	st'k, etc.	----------	15 inches -----
	APIUM (CELERY, ETC.)								Europe --			
	Graveolus (*Garden Celery*)								----------	----------	bien. herb--	----------
1	White Solid	*	*	*	*	-------			----------	eat. etc..	stronggrow	tall ----
	CARUM (CARAWAY, ETC.)											
	Petroselinum (*Parsley*)					*	*	*	Europe --	cooking.	bien. herb--	----------
	PASTINACA (PARSNIP).											
	Sativa (*Common Parsnip*)								Europe --	----------	bien. herb--	----------
1	Guernsey	-----		*	*	-------			Guernsey-	cook.etc.	----------	3 feet
2	Large Hollow Crown	*	*	*	*	-------			----------	----------	----------	18 inches
3	Sugar	----------				*	*	*	----------	----------	----------	----------
	DOGWOOD. CORNUS.											
	Florida (*Flowering Dogwood*)	*	*	*	*	*	*	*	America--	orn -----	----------	12—30 feet
	Sanguinea (*Red Twig Dog'd*)	*	*	-----		*	*	*	Europe ---	orn -----	----------	----------
	HONEYSUCKLE. LONICERA.											
	Semtervirens (*Trumpet Flow*)	----------							America--	----------	climber ----	----------
1	Scarlet Trumpet	*	*	*	*	*	*	*	----------	orn -----	climber ----	----------
	Japonica (*Chinese*)	*	*	*	*	*	*	*	Japan?----	orn -----	climber ----	----------
	Tartarica (*Tartarian*)	----------							----------	----------	shrub - ----	5—8 feet
1	Red Tartarian	*	*	*	*	*	*	*	----------	----------	----------	----------
2	Upright White	-----		*	*	-------			----------	orn -----	----------	----------
3	Upright Yellow	-----		*	*	-------			----------	orn -----	----------	----------
	VIBURNUM.											
	Opulus											
1	Cranberry Tree	----------							America --	fruit, etc.	----------	----------
2	Snowball	*	*	*	*	*	*	*	Europe ---	orn -----	----------	----------
	COMPOSITE. CALLISTEPHUS.											
	Chinensis (*China Aster*)	**	**	**	**	**	**	**	China-----	orn -----	----------	----------
	DAHLIA.											
	Variabilis	----------							Mexico ---	orn -----	per. herb---	----------
1	Augustus Bougler	----------				*	*	*	----------	----------	----------	----------
2	Aurora	----------				*	*	*	----------	----------	----------	----------
3	Bannaid	*	*	----------					--- ------	----------	----------	----------
4	Clio	----------				*	*	*	----------	----------	----------	----------
5	Dandy	*	*	----------					----------	----------	----------	----------
6	Dr. Bozes	*	*	----------					----------	----------	----------	----------
7	Duke of Wellington	*	*	*	*	-------			----------	----------	----------	----------
8	Emperor de Maroc	*	*	----------					----------	----------	----------	----------
9	Frank Smith	*	*	----------					----------	----------	----------	----------
10	Jessie	-----		*	*	*	*	*	----------	----------	----------	----------
11	John Keynes	*	*	----------					----------	----------	----------	----------
12	Marc Antony	----------				*	*	*	----------	----------	----------	----------
13	Mauve	*	*	----------					----------	----------	----------	----------
14	Mt. Blanc	*	*	----------					----------	----------	----------	----------
15	Pafillo	----------				*	*	*	----------	----------	----------	----------
16	Queen Mab	----------				*	*	*	----------	----------	----------	----------
17	Queen of Bea	----------				*	*	*	----------	----------	----------	----------
18	Rembrandt	*	*	----------					----------	----------	----------	----------
19	Richard Cobden	*	*	*	*	-------			----------	----------	----------	----------
20	William Dodd	*	*	----------					----------	----------	----------	----------
	HEATH.											
	GAYLUSSACIA (HUCKLEB'Y)	----------							America --	fruit ----	----------	----------
	Resinosa (*Com. or Black H.*)	-----		----------					----------	eat. etc..	shrub -----	1—3 feet
	VACCINIUM.	----------							----------	fruit ----	----------	----------
	Corymbosum (*Com. S. Blue'y*)	----------							----------	----------	shrub -----	3—10 feet
	Pennsylvanicum (*Dw'f Blue'y*)	----------							----------	----------	shrub -----	6—15 inches
	Macrocarpon (*Cranberry*)	----------							----------	----------	shrub -----	1—3 feet
	EBONY.											
	DIOSPYROS (PERSIMMON).											
	Virginiana (*Common*)	-----		*	*	*	*	*	America--	fruit, etc.	tree-------	20—60 feet
	BIGNONIA.											
	TECOMA (TRUMPET FLOW).											
	Radicans (*Trumpet Creeper*)	*	*	*	*	*	*	*	America--	orn -----	climber ----	----------
	CATALPA.											
	Bignonioides	**	**	**	**	**	**	**	America--	orn, etc.	tree-------	30—90 feet
	VERVAIN.											
	VERBENA.	**	**	**	**	**	**	**	America--	orn -----	herbs -----	----------
	POLEMONIUM.											
	PHLOX.											

OF PLANTS, Etc.				PECULIARITIES OF FRUIT, Etc.				Season.	
Hardin's	Foliage, etc	Flowers.	Product.	Size.	Shape.	Color.	Flavor.		No.
				small	cylindrical	orange	v. good	early	1
				large		red or	good	late	2
hardy	large							early	1
	strong								1
	short								2
									3
	ovate	in. white yel							
	ovate					dark			
	evergreen								
		scarlet, etc.				red			1
	heartshap'd					red			
		red							1
		white							2
		yellow							3
		white		small	oblong	bright red	acid		1
		white							2
		various							
	pinnate								
									1
									2
		scarlet, etc.							3
									4
		blu. cri. etc.							5
		bright scar.							6
		or. scar.							7
		vel. & white							8
		scarlet							9
		scarlet. etc.							10
		rose & buff.							11
									12
		mauve							13
		pure white.							14
									15
									16
									17
		scar.&white							18
		dark.							19
		yellow.							20
hardy	oval	white		small	round	black	sweet		
	oval			small	round	black	sweet		
	shining			small	obl'g, etc.	black	sweet		
				small	round, etc.	red	acid	late	
				sma. etc.	roundish	yellow	v. sweet	Sept.Dec	
		yellow, etc.							
tender	large	white							
		various							

No.	NAMES.	DISTRICTS. N. 1	2	C. 3	4	S. 5	6	7	Origin.	Use.	PECULIARITIES Class, Etc.	Hei't or Shape
	Drummondii	**	**	**	**	**	**	**	Texas	orn	annual	herb
	CONVOLVULUS.											
	IPOMŒA (MORN. GLORY).											
	Batatas (Sweet Potato)								E.&W.Ind	tuberous	per herb	
1	Brazilian			*	*				S. Amer.?	market		
2	Nansemond	*	*	*	*	*	*	*	Virginia	eat. etc.		
	NIGHTSHADE.											
	LYCOPERSICUM (TOMATO).											
	Esculentum								S. America		an. herb	
1	Cook's Favorite			*	*				N. J.			
2	Fejee			*	*	*	*	*				
3	Keyes' Early Prolific			*	*							
4	Large Red			*	*							
5	Large Round Smooth	*	*	*	*							
6	Large Yellow	*	*	*	*							
7	Tilden	*	*	*	*	*	*	*				
	SOLANUM (NIGHTSHADE).											
	Melongena (Egg Plant)								Africa, etc.	cooking	an. herb	
1	Long Purple			*	*	*	*	*				2—3 feet
	Tuberosum (Potato).											
1	Buckeye	*	*	*	*				West			vigorous
2	Early Dykeman	*	*	*	*	*	*	*				medium
3	Early Goodrich			*	*	*	*	*				
4	Early Rose			*	*	*	*	*				
5	Early White Sprout			*	*							
6	Early York	*	*	*	*							
7	English Fluke	*	*	*	*	*	*	*				
8	Gleason			*	*							
9	Neshannock			*	*	*	*	*				
10	Peach Blow	*	*	*	*							
11	Prince Albert			*	*							
12	Shaker Russet			*	*							
	PETUNIA.											
	Violacea (Petunias)	**	**	**	**	**	**	**	S. America	orn	an. herb	
	DOGBANE.											
	VINCA (PERIWINKLE).	**	**	**	**	**	**	**	Europe?	orn	perennial	trailing herb
	OLIVE.											
	FORSYHIA.											
	Viridissima	*	*	*	*	*	*	*	China, etc.	orn	shrub	vigorous
	SYRINGA.											
	Vulgaris (Common)	*	*	*	*	*	*	*	Persia?	orn	shrub	8—15 feet
	Persica (Persian)	*	*	*	*	*	*	*	Persia	orn	shrub	
	CHIONANTHUS.											
	Virginica (Fringe Tree)	tend.	*	*					America	orn	shrub	
	FRAXINUS (ASH).											
	Excelsior (English Ash)			*	*				Europe	orn	tree	80—90 feet
	Pendula			*	*				Europe	orn		
	Americana (White)	**	**	**	**	**	**	**	America	tim. etc.	tree	100 feet
	Sambucifolia (Black)			*	*				America	h'ps, etc.	small tree	
	Quadrangulata (Blue)					*	*	*	America	tim. etc.	tree	70 feet
	GOOSEFOOT.											
	BETA (BEET).											
	Vulgaris (Common Beet)								S. Europe.	food	bien. herb	
1	Bassano			*	*				Italy			
2	Blood Turnip	*	*	*	*	*	*	*				
3	Long Smooth Blood	*	*	*	*	*	*	*				18 inches
4	White Sugar	*	*	*	*	*	*	*				16 inches
	BUCKWHEAT FAMILY.											
	RHEUM (RHUBARB).											
	Rhaponticum								Asia?	food, etc.	per herb	
1	Linnæus			*	*							
2	Victoria	*	*	*	*							
	LAUREL FAMILY.											
	Sassafras											20—70 feet
	Officinale	*	*			*	*	*	America	orn. etc.	tree	
	SPURGE.											
	BUXUS.											
	Sempervirens (Box)	*	*						Mediter'n	orn. bor.		
	NETTLE.											
	ULMUS (ELM).											
	Fulva (Slippery)	**	**	**	**	**	**	**	America	orn	tree	40—50 feet
	Campestris (English)			*	*				European	orn	tree	60—70 feet
	Americana (White)	**	**	**	**	**	**	**	America	orn. etc.	tree	100 feet

OF PLANTS, Etc.				PECULIARITIES OF FRUIT, Etc.				Season.	
Hardin's	Foliage,etc	Flowers.	Product.	Size.	Shape.	Color.	Flavor.		No.
		various							
				large					1
				large		yellow	sweet	early	2
	light green		prolific	medium	oval	deep red			1
hardy				large		red	good		2
								v. early	3
				large	flat	red	good	late	4
					round	br. red		late	5
hardy			prolific	large	flat	yellow	sweet		6
			prolific	large	oval	scarlet	good	early	7
		purple			oblong	purple			1
				large	round	white	v. good	v. early	1
			product	large	roundish	white	variable	early	2
			product	large		white	v. good	v. early	3
									4
									5
									6
									7
									8
									9
			product?	large	roundish	pink red			10
									11
									12
		purple, etc.							
		blue, etc.							
	oblong	yellow							
	ovate	pale vio. etc							
		lilac pur.etc							
		white							
hardy	bright green				flat, ob				
hardy									
hardy									
hardy									
	num. erect			small	flat	rose red	good	v. early	1
	erect scanty			medium	turbincle	pur. red	v. good	early	2
				v. large		black pur	v. good	late	3
	green			large	fusiform	white	sugary	late	4
	small		product				high flavor	early	1
	large		v. prod				acid		2
	dp gr.aut.rd	yellow		small	oblong	purple		late	
tender		rose red							
	aut. yellow								
	aut. yellow								
	aut. yellow								

No.	NAMES.	DISTRICTS. N. 1	2	C. 3	4	S. 5	6	7	Origin.	Use.	PECULIARITIES Class, Etc.	Hei't or Shape
	Alata (Winged)					*	*	*	America	orn	tree	
	MORUS (MULBERRY.)											
	Rubra (Red)	*	*	*	*	*	*	*	America	tim. etc.	low tree	15—25 feet
	Alba								China	leav. etc.	small tree	
1	Downing's Everbearing					*	*	*	N. Y.	fruit		
	MÆLURA.											
	Aurantiaca (Osage Orange)	**	**	**	**	**	**	**	Ark., etc.	hed. etc.	low tree	25—50 feet
	PLANE-TREE FAMILY.											
	PLATANUS.											
	Occidentalis (Sycamore)	*	*			*	*	*	America	orn	tree	125 feet
	WALNUT FAMILY.											
	JUGLANS (WALNUT.)											
	Cinerea (Butternut)	**	**	**	**	**	**	**	America	tim. etc.	tree	20—50 feet
	Nigra (Black Walnut)	**	**	**	**	**	**	**	America	tim. etc.	tree	110 feet
	Regia (English Walnut)					*	*	*	Asia	nuts, etc.	tree	
	CARYA (HICKORY.)											
	Olivæformis (Pecan)					*	*	*	Ill., etc.	nuts, etc.		130 feet
	Alba (Shellbark)	**	**	**	**	**	**	**	America	tim. etc.		60—80 feet
	Sulcata (West. Shellbark)	*	*			*	*	*	America	nuts, etc.		60—80 feet
	Amara (Bitternut)	*	*	*	*				America	timber		60 feet
	OAK FAMILY.											
	QUERCUS.											
	Alba (White Oak)	**	**	**	**	**	**	**	America	tim. etc.		70—100 feet
	Macrocarpa (Overcup)	**	**	**	**	**	**	**	America	tim. etc.		125 feet
	Prinus (Chestnut)			*	*	*	*	*	America	tim. etc.		90 feet
	Coccinea (Scarlet)								America	tim. etc.		
	Tinctoria (Black)	*	*	*	*	*	*	*	America	tim. etc.		80—90 feet
	Rubra (Red)	**	**	**	**	**	**	**	America	tim. etc.		60—90 feet
	Palustris (Swamp, Spanish)					*	*	*	America	orn. etc.		60—80 feet
	CASTANEA (CHESTNUT.)											
	Vesca (European)								Europe			
	—— *(Americana)*	**	**	**	**	**	**	**	America	fruit, etc.		60—80 feet
	FAGUS (BEECH.)											
	Ferruginea (American)					*	*	*	America	orn. etc.		100 feet
	Sylvatica (European)								Europe	orn. etc.		
	Purpurea			*	*	*	*	*				
	CORYLUS.											
	Avellana (Filbert)								Europe	nuts		5—10 feet
	Americana (Hazel)	*	*	*	*	*	*	*	America			4—6 feet
	OSTRYA.											
	Virginica (Hop Hornbean)	*	*	*	*				America			30—50 feet
	BIRCH FAMILY.											
	BETULA (BIRCH.)											
	Lenta (Sweet)			*	*				America	timber		30—60 feet
	Alba (White)	*	*	*	*	*	*		timber			20—25 feet
	Populifolia	*	*	*	*				America	orn		20—25 feet
	Nigra (Red)			*	*				America	orn		40—70 feet
	WILLOW FAMILY.											
	SALIX (WILLOW.)											
	Purpurea (Purple)					*	*	*	Europe	baskets		
	Viminalis (Basket)	*	*			*	*	*	Europe	baskets		
	Babylonia (Weeping)	*	*			*	*	*	Orient	orn		30—50 feet
	Alba (White)	**	**	**	**	**	**	*	Europe	tim. etc.		30—60 feet
	Vitellina (Golden)	*	*	*	*	*	*	*	Europe	os'rs, etc		30—50 feet
	Cafrea (Goat W.)					*	*	*	England	orn		
	Forbyana (Forbes W.)	*	*						England	bask. etc		
	POPULUS (POPLAR.)											
	Alba (Abele)			*	*				Europe	orn	spreading	30—60 feet
	Dilatata (Lombardy)	**	**	**	**	**	**	**	Europe	orn	fastigiate	60—80 feet
	Monilifera (Cottonwood)	**	**	**	**	**	**	**	America	tim. etc.	spreading	130 feet
	Balsamifera (Balsam)			*	*				America	medici'al	round head.	80 feet
	PINE FAMILY.											
	PINUS (PINE.)											
	Ponderosa (Heavy Wooded)	**	**	**	**	**	**	**	California	timber		100 feet
	Sylvestris (Scotch)	**	**	**	**	**	**	**	Europe	timber		80 feet
	Austriaca (Austrian)	**	**	**	**	**	**	**	Austria	timber		
	Resinosa (Red)	*	*	*	*	*	*	*	America	timber		50—80 feet
	Strobus (White)	**	**	**	**	**	**	**	America	tim. etc.		100—200 feet
	ABIES (SPRUCE FIR.)											
	Excelsa (Norway)	**	**	**	**	**	**	**	Europe	orn. etc.		120—150 feet
	Nigra (Black)	*	*	*	*				America	orn		75 feet
	Alba (White)	**	**	**	**	**	**	**	America	orn		25—50 feet
	Canadensis (Hemlock)	**	**	**	**	*	*	*	America	orn		70—80 feet

OF PLANTS, Etc.				PECULIARITIES OF FRUIT, Etc.				Season.	No.
Hardin's	Foliage, etc	Flowers.	Product.	Size.	Shape.	Color.	Flavor.		
	large			small	cylindrical	purple	sweet	early	
tender				small	cylindrical	black	sweet	ev. bear.	1
	glossy								
tend. N.	v. large				globular	d'p. brown			
	aut. yellow			large	oblong	brown	sweet		
	aut. yellow			large	roundish	black	sweet		
tender									
				medium	oblong		best		
				small	flat	white	v. good		
				v. large	flat	yellowish	good		
				medium	globular	white	bitter		
	pale green			small	oblong		sweet		
				v. large	roundish				
				large					
	glossy				roundish				
					oblong				
					roundish				
	lanceolate			large					
	lanceolate			small			sweet		
	ob. ovate			small		brown	sweet		
	heart-shape			large	roundish	brown	sweet		
	heart-shape			small	roundish	brown	sweet		
	ovate								
	ovate								
	glossy								
	ovate								
	lanceo'ate								
	ovate								
	heart-shape								
	triangular								
	triangular								
	lance-ovate								
	3 in sheath			large					
	2 in sheath			medium					
	2 in sheath			medium					
	2 in sheath			medium					
	5 in sheath			large					
	short			large					
	v. short			small					
	short			small					
tender	v. short			v. small					

No.	NAMES.	DISTRICTS. N. 1	2	C. 3	4	S. 5	6	7	Origin.	Use.	PECULIARITIES Class, Etc.	Hei't or Shape
	Balsamea (*Balsam*)	*	*	----		*	*	*	America	orn	----	30—40 feet
	Pectinata (*Silver Fir*)	tend.		*	*	*	*	*	Europe	orn	----	100—150 feet
	LARIX (LARCH.)											
	Europea (*European.*)	*	*	*	*	----			Europe	tim. etc.	----	80—100 feet
	Americana (*American*)	*	*	*	*	----			N.Amer.	tim. etc.	----	----
	TAXODIUM (CYPRESS.)											
	Distichum (*American*)	----		*	*	*	*	*	America	tim. etc.	----	120 feet
	THUJA (ARBOR VITÆ.)											
	Occidentalis (*American*)	**	**	**	**	**	**	**	America	orn	----	20—25 feet
	Var. Siberian	**	**	**	**	**	**	**	England?	orn	----	----
	JUNIPERUS (JUNIPER.)											
	Virginiana (*Red Cedar*)	**	**	**	**	**	**	**	America	tim. etc.	----	30—40 feet
	Sabina (*Savin*)	----		*	*	*	*	*	Europe	----	----	----
	SALISBURIA.											
	Adiantifolia (*Ginkgo*) *Tree*	----							Japan	----	----	40—80 feet
	AMARYLLIS.											
	NARCISSUS.	**	**	**	**	**	**	**	----	----	per. herb	----
	POLIANTHES (TUBEROSE.)											
	Tuberosa	**	**	**	**	**	**	**	Mexico	orn	per. herb	----
	IRIS FAMILY.											
	IRIS (FLOWER DE LUCE.)											
	Germanica (*Common*)	**	**	**	**	**	**	**	Europe	orn	per. herb	----
	LILY FAMILY.											
	LILIUM.	----							----	----	per. herb	----
	Tigrinum (*Tiger*)	*	*	*	*	*	*	*	China	orn	----	4—5 feet
	Carolinum (*Carolina*)	----				*	*	*	America	orn	----	2—3 feet
	Speciosum	----				*	*	*	Japan	orn	----	1—3 feet
	Auratum (*Golden*)	*	*	----			*	--	Japan	orn	----	1—3 feet
	Japonicum (*Japan*)	----		*	*	*	*	*	Japan	orn	----	2 feet
	Candidum	*	*	----					Persia, etc	orn	----	----
	Longiflorum	----				*	*	*	Japan	orn	----	1 foot
	TULIPA (TULIP.)											
	Gesneriana (*Common*)	----						---	Asia Min.	orn	per. herb	----
	ALLIUM (ONION, ETC.)											
	Cepa (*Onion*)	----				----			Europe	eat. etc.	per. herb	----
1	Clove	*	*	*	*	----			----	----	----	----
2	Top	*	*	----					----	----	----	----
3	Wethersfield Large Red	----		*	*	----			Conn.	mar. etc.	----	----
4	Yellow Danvers	----		*	*	----			Mass.	----	----	----
	HYACINTHUS.											
	Orientalis	**	**	**	**	**	**	**	Levant	orn	per. herb	----
	YUCCA.											
	Filamentosa	**	**	**	**	**	**	**	----	orn	----	3—6 feet
	GRASS FAMILY.											
	ZEA.											
	Maize (*Indian Corn*)	----							America	grain	an. herb	8—11 feet
1	Adams' Early	----		*	*	*	*	*	----	mar. etc.	----	----
2	Bates' Early	----		*	*	----			----	----	----	----
3	Forty Days	----		*	*	*	*	*	----	----	----	----
4	Mammoth Sugar	----		*	*	----			----	----	----	----
5	Stowell's Evergreen	*	*	*	*	*	*	*	----	----	----	6—7 feet
6	Tuscarora	----		*	*	----			----	----	----	5—6 feet

OF PLANTS, Etc.				PECULIARITIES OF FRUIT, Etc.				Season.	No.
Hardin's	Foliage, etc.	Flowers.	Product.	Size.	Shape.	Color.	Flavor.		
tender	short			large					
tender	short			large					
	short			small					
	short			v. small					
	short			small					
	small			small					
	small			small					
	small			small					
		white							
		white, etc.							
		deep violet.							
		or. red							
		or. red							
		white, etc.							
		white, etc.							
		white							
		white							
		white							
		various							
	hollow	white							1
				large	roundish		coarse		2
			product.	large	roundish	red			3
			product.	large	globular	yellow	mild		4
		various							
		white							
				large	cylindrical	white, etc.			
				7—8 in.		white	not sweet.	early	1
									2
									3
								late	4
			product.	6—7 in.	conical	yel. white.	swect.	medium	5
				12 in.		white	not sweet.	medium	6

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